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Engraved by J B Hunt from a Photograph

Mr. Richard Hornsby,
Agricultural Engineer,
Spittle Gate Iron Works, Grantham, Lincolnshire.

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THE FARMER'S MAGAZINE.

JANUARY, 1858.

PLATE I.

PORTRAIT OF MR. RICHARD HORNSBY.

PLATE II.

TWO LABOURERS' COTTAGES.

(For description see page 81.)

MR. RICHARD HORNSBY,

AGRICULTURAL ENGINEER, OF SPITTLEGATE WORKS, GRANTHAM, LINCOLNSHIRE.

If undeviating integrity, earnestness of intention, and a thorough knowledge of his profession should bring success, Mr. Hornsby has surely earned his reward. One is at a loss which to admire the more, the genuine straight-forward character of the man himself, or the excellence of those inventions with which his name is identified. But, after all, one is only the reflection of the other. We see in the good, sound, durable machinery that Hornsby and Sons send out, how the spirit of the master-mind has been employed upon them. From him the whole works take their tone. There shall be nothing here but what is honestly fitted for its purpose. Turning neither to the right nor the left, uninfluenced by any other consideration, the aim of the House has been to supply the farmer with those implements really best adapted for his use. This is now, and indeed has long been, well known; and we but echo the opinion of the whole country when we say, there are no people with whom a man can deal with more confidence than with the Hornsby's of Grantham.

This firm has now been established as that of Hornsby alone something like thirty years. It owes its origin and gradual development to the man whose portrait here occupies so worthy a place in our pages. Much as the business and repute of the house have increased of late years, under the careful direction of his eldest son, it was Richard Hornsby himself who not only commenced, but established it. Like many other good men before him, who have honestly risen to eminence, we trace him back to small beginnings—the road-side foundry—the master-man, busy at the forge—the gradual extension from one department to another until many hundreds have to look to him for their sustenance; and the town he entered a comparative stranger, points to him and his as its pride and boast.

The county, however, has an equal claim to him. Mr. Hornsby is both Lincolnshire born and bred. We have to go so far back as the summer of 1790 for the time of his birth—on rather a memorable day at that period, being no other than the fourth of June, the birth-day of good King George himself. The Hornsbys then farmed at Elsham, near Brigg, where the son continued until his fifteenth year. He was at best but a delicate boy ;a nd, much against his friends' inclination, who would have preferred his adopting some less laborious pursuit, bound himself apprentice, in 1805, to Mr. Havercroft, a wheelwright at Barnetby-le-Wold. His new master shared the fears of his own relations as to his ever being able enough for such work, remarking, on first seeing him, that "he looked far more like filling a coffin than making one." The choice, however, was a good one. The pursuit agreed with him, and in five years' time he left Barnetby a hale, hearty man.

Mr. Hornsby turned his steps towards Grantham, where he quickly engaged himself with one Mr. Seaman, of the Spittle or Hospital Gate. The latter had discrimination enough to appreciate the value of his young workman. On the first of January, 1815, a business was opened under the title of "Seaman and Hornsby, Makers of Horse Thrashing Machines, &c., &c." The firm prospered, and in eleven years from this time we find Mr. Hornsby entering into a partnership of a yet more agreeable character. In a word, his marriage further settled him as a Grantham man, while but two years more found him with the works altogether under his own control. In the December of 1828, Mr. Seaman retired with a competency, and the business was known henceforth as that of Hornsby's solely.

The success of the House may be dated from this period. It was in Mr. Hornsby's hands that the trade gradually extended, and its repute proportionably increased. It was under his immediate inspection that the machinery, for which they are still so famous, was first tried. It was with his imprimatur that the horse thrashing-machines* bowed to the power of steam; that the drills (first made here in 1815) were improved, and the dressing-machines were perfected. From this it is but an old story of well-merited distinction, with the old moral of going again to those who use you the best. Public and private experience have alike confirmed this; and the Hornsbys have never received a premium or an order but that they deserved it. Let their long ranges of workshops, and their hundreds of men in them, speak to the latter; while for the former we have some as readily available proof.

For their Improved Patent Portable Steam Engines they have been awarded:—

At the Imperial Royal Agricultural Society of Austria, at Vienna, May, 1857, the Gold Medal.

At the Hungarian Agricultural Society, at Pesth, June, 1857, the highest Diploma of Merit.

At the Universal Agricultural Exposition, Paris, 1856, the First Prize of £24 and Gold Medal, for the best Portable Steam Engine for Agricultural Purposes.

At the Universal Exposition at Paris, 1855, the Medal of Honour, for the best Portable Steam Engine.

At the Great Exhibition of the Industry of all Nations, held at the Crystal Palace, Hyde Park, London, July, 1851, for the best Portable Steam Engine for Agricultural Purposes, the First Prize or Council Medal.

	£	s.
By the North Lincolnshire Agricultural Society, Boston, August, 1855	20	0
By the Bath and West of England Agricultural Society, at Tiverton, June, 1855	10	0
By the Royal Agricultural Society of England, at Lincoln, July, 1854	20	0
By the Bath and West of England Agricultural Society, at Bath, June, 1854	10	0
By the Selby and Tadcaster Agricultural Society, at Selby, July, 1854	20	0
By the Herts Agricultural Society, at Hertford, October, 1854	5	0
By the Great Yorkshire Agricultural Society, at York, August, 1853	12	10
By the North Lincolnshire Agricultural Society, at Gainsborough, July, 1853........	20	0
By the Royal Agricultural Society of England, at Gloucester, July, 1853	10	0
By the Bath and West of England Agricultural Society, at Plymouth, June, 1853	15	0
By the Royal Agricultural Society of England, at Lewes, July, 1852......................	40	0
By the North Lincolnshire Agricultural Society, at Horncastle, July, 1852	7	0
By the Great Yorkshire Agricultural Society, at Sheffield, August, 1852	15	0
By the Royal North Lancashire Agricultural Society, held at Preston, August, 1852	5	0
By the North Lincolnshire Agricultural Society, at Horncastle, July, 1852	£20	0
By the North Lincolnshire Agricultural Society, at Caistor, July, 1851..............	20	0
By the Great Yorkshire Agricultural Society, at Bridlington, August, 1851	15	0
By the Royal Agricultural Society of England, at Exeter, July, 1850	50	0
By the Royal Agricultural Society, at York, July, 1848	50	0
By the North Lincolnshire Agricultural Society, at Lincoln, July, 1848	20	0

For the Patent Combined Thrashing, Shaking, and Pressing Machine:

At the Universal Exposition at Paris, 1855, the Medal of Honour.

By the Royal Agricultural Society of England, at Carlisle, July, 1855, the First Prize of....	20	0
By the North Lincolnshire Agricultural Society, at Boston, August, 1855, the First Prize of..	5	0
By the Royal Agricultural Society of England, at Lincoln, July, 1854, the First Prize of ..	10	0
By the Selby and Tadcaster Agricultural Society, at Selby, July, 1854, the First Prize of	20	0
By the Herts Agricultural Society, at Hertford, October, 1854, the First Prize of..........	5	0
By the Northamptonshire Agricultural Society, at Oundle, Sept., 1853, the First Prize of ..	5	0
By the North Lincolnshire Agricultural Society, at Gainsborough, July, 1853, the First Prize of	5	0
By the North Lincolnshire Agricultural Society, at Horncastle, July, 1852, the First Prizes, amounting to	26	0
By the Great Yorkshire Agricultural Society, at Sheffield, August, 1852, the First Prize of	10	0
By the Highland Society of Scotland, at Glasgow, August, 1857, the First Prize of......	10	0

For Patent Drills of every kind:—

By the Royal Agricultural Society of England, at Salisbury, July, 1857—

For the best drill for general purposes	5	0
For the best turnip, seed, and manure drill....	5	0
For the best corn drill	2	0

At the Universal Agricultural Exposition at Paris, June, 1856, for the best drill for general purposes, the First Prize of £10, and the Gold Medal; for the best corn and seed drill, the First Prize of £10, and the Gold Medal.

At the Universal Exposition at Paris, 1855, the Medal of Honour, for the best corn and seed drill, and for the best drill for general purposes.

At the Great Exhibition of the Industry of All Nations, held at the Crystal Palace, Hyde-park, London, 1851, for the best corn and seed drill, the Great Council Prize Medal; for the best turnip and manure drill for either ridges or flat ground, the Great Prize Medal.

For the best drop Drill for depositing turnip or mangold wurtzel seed at any required intervals, and in any given quantity, the Great Prize Medal.

By the Royal Agricultural Society of England at Carlisle, July, 1855:—

	£	s.
For the best corn and seed Drill	10	0
For the best small occupation corn Drill......	5	0
For the best turnip Drill with manure........	5	0

By the Royal Agricultural Society of England, at Lincoln, July, 1854:—

	£	s.
For the best Drill for general purposes	10	0
For the best corn and seed Drill	10	0
For the best turnip Drill, on the flat, with manure	5	0
For the best turnip Drill, on the ridge, with manure	5	0

---

* In 1830, the labourers of Lincolnshire conceived a violent dislike to these horse-thrashing machines, and traversed the country in mobs, destroying them. The farmers became much alarmed, and Mr. Hornsby's yards were filled with such implements, consigned by them to his care. His premises consequently became a mark for the rioters; but they were never attacked, as the men, having gained their point with the masters, went back to work with the flail. In a very short time they again revolted, or, rather, asked as a favour that the thrashing-machines might be brought back! From that day their use was everywhere recognised, until in turn they had to succumb to steam-power.

By the Royal Agricultural Society of England, at Gloucester, July, 1853:—	£	s.
For the best corn and seed Drill, with R. H. and Son's patent fore-carriage steerage	10	0
For the best turnip and mangold wurtzel and manure Drill, on the ridge	10	0

By the Royal Agricultural Society of England, at Lewes, July, 1852:—	£	s.
For the best Drill for general purposes	10	0
For the best corn and seed Drill	10	0
For the best turnip, mangold wurtzel, and manure Drill, on the flat	10	0
For the best turnip, mangold wurtzel, and manure Drill, on the ridge	10	0

By the Royal Agricultural Society of England, at Exeter, July, 1850:—	£	s.
For the best corn and turnip Drill	10	0
For the best Drill for turnips and manure, on the flat..............................	10	0
For the best Drill for turnips and manure, on the ridge	10	0

With other similar prizes at earlier meetings of the Royal Agricultural Society, as well as at the Yorkshire, West of England, and others.

For Corn-dressing Machines :

	£	s.
The Medal of Honour at the Universal Exposition at Paris.		
By the North Lincolnshire Agricultural Society, at Boston, August, 1855..................	0	10
By the Royal Agricultural Society of England, at Carlisle, July, 1855, first prize of	5	0
By the Bath and West of England Agricultural Society, at Tiverton, June, 1855............	3	0
By the Royal Agricultural Society of England, at Lincoln, July, 1854, first prize of	5	0
By the Bath and West of England Agricultural Society, at Bath, June, 1854, the first prize of	5	0
By the Selby and Tadcaster Agricultural Society, at Selby, July, 1854, first prize of..........	2	10
By the Great Yorkshire Agricultural Society, at Ripon, August, 1854, first prize of..........	2	0
By the Herts Agricultural Society, at Hertford, October, 1854, first prize of	2	0
By the Royal Agricultural Society of England, at Gloucester, July, 1853, the first prize of	5	0
By the Bath and West of England Agri. Society, at Plymouth, June, 1853, the first prize of....	3	0
By the North Lincolnshire Agricultural Society, at Gainsborough, July, 1855, the first prize of	1	0
By the Royal Agricultural Society of England, at Lewes, July, 1852, first prize of..........	10	0
By the North Lincolnshire Agricultural Society, at Horncastle, July, 1852, the first prize of ..	1	5
By the Yorkshire Agricultural Society, at Sheffield, August, 1852, the first prize of........	5	0
By the Royal North Lancashire Agri. Society, at Preston, August, 1852, the first prize of ..	3	0
By the Yorkshire Agricultural Society, at Bridlington, August, 1851, the first prize of......	5	0
By the Royal Agricultural Society of England, at Exeter, July, 1850, the first prize of......	10	0
By the Royal Agri. Society, at Norwich, July, 1849	10	0
By the Royal Agri. Society, at York, July, 1848	10	0
By the Royal Agricultural Society, at Newcastle-upon-Tyne, July, 1846..	3	0
By the North Lincolnshire Agricultural Society, at Caistor, July, 1851	2	0
By the North Lincolnshire Agricultural Society, at Louth, July, 1850	3	0
By the North Lincolnshire Agricultural Society, at Brigg, July, 1849....................	3	0
By the North Lincolnshire Agricultural Society, at Lincoln, July, 1848....................	3	0
By the North Lincolnshire Agricultural Society, at Spilsby, July, 1847....................	3	0
By the North Lincolnshire Agricultural Society, at Market Rasen, July, 1846..	3	0
By the North Lincolnshire Agricultural Society, at Gainsborough, July, 1845	10	0
By the Yorkshire Agricultural Society, at Beverley, August, 1845, the Prize Medal.		
By the Lincolnshire Agricultural Society, at Sleaford, August, 1845....................	1	10

The firm has been also successful with cake crushers and chaff cutters; numbering in all about 200 money prizes, of about £1400 value, and 21 gold, silver, and bronze medal prizes. These include the Great Council medal at the Exhibition of the Industry of all Nations, London, 1851; the Grand Medal of Honour, at the Universal Exposition at Paris, 1855; three gold medals at the Universal Agricultural Exposition at Paris, 1856; the gold medal at the Imperial Royal Agricultural Society of Austria, at Vienna, 1857; and the gold medal at the Agricultural and Horticultural Society of Gers, at Condom, 1857.

In appropriate commentary on this legion of honours, we may avail ourselves of the following well-written description from the *Official Illustrated Guide to the Great Northern Railway*:—

"No visitor to Grantham should leave the town without visiting the immense manufactory of Messrs. Hornsby and Son, whose agricultural implements have gained for them a world-wide reputation. Those who inspected the rich collection of machinery devoted to farming purposes, at the Great Exhibition of 1851, will remember the encomiums awarded to the productions of this eminent firm. The wonderful development in this department of science, and the great demand for first-class articles, are partly exemplified in the history of Mr. R. Hornsby's career. Forty years ago this gentleman walked into Grantham,—without capital or friends, it is true; but endowed with a patience and determination which speedily placed him on the high road to success: his present position is entirely owing to the intelligence with which he has studied the requirements of agricultural interests, and to the encouragement he has given to inventions of great ability and convenience. The works of Messrs. Hornsby and Son possess an interest which all must acknowledge and appreciate. *The Turnery*, into which the visitor is ushered on his visit to this manufactory, will prepare him, in some measure, for the extensive operations of this firm. In the immense department for machinery are the corn-drill, successfully introduced by Mr. Hornsby in the early days of his career, and exhibited at the world's bazaar in 1851, where a 'council medal' was awarded for it. Five of these machines, each combining various excellencies, were then shown. The ten-rowed corn and *general purpose* drill is a 'highly finished machine, with an improvement patented by this firm, of India-rubber tubes for conducting the seed down to the channel made by the coulter, which is a valuable improvement upon the old plan of a series of cups, made of tin, working one within the other. This drill has also another improvement of two coulter bars, by which an equal pressure is obtained upon every coulter, and the double-action lever enables the manure to be deposited to any depth, and covered up previous to the seed being deposited.' The visitor, in promenading through this great manufactory, will do well to notice the moveable steam engines, for which Messrs. Hornsby and Son received the preference at the Great Exhibition over all their competitors; and have taken the first prizes in twenty-one out of twenty-three public competitions. The services rendered to agriculture by this little machine are invaluable. The necessity of threshing corn under cover in barns is obviated by this steam engine, the rick now being threshed in the open air at once as it stands. 'Instead of three or more barns clustering round the homestead, a single building will now suffice for dressing corn and chaff-cutting.' Besides these, there are many uses to which the moveable steam engine may be applied. The winnowing machines of the same manufacturers elicited the following verdict of the Judges at the York Agricultural Meeting:—'Several machines,' they say, 'were tried, but could not get through the grain, shorts, straw, and chaff, as it came from the threshing machines, without being choked, or requiring much more time than Hornsby's, *which did its work well*, parting the whole into best corn, good tail, tail, whites, screenings, and chaff, at the rate of about fifteen quarters an hour, and dressing over the second time at the rate of about twenty quarters per hour, parting the whole into six parts, as before, in a workmanlike manner.' 'Such masterly mastication and digestion, making the contents of our supposed wheat rick, forty quarters, in five hours ready for market, must be appreciated by farmers.'

"The whole of the operations in this establishment are on a great scale, and will astonish the uninitiated visitor. The plant is estimated at £100,000. The number of hands employed is 500. There are rooms and yards for every department of implement manufacturing:—for carpenters' work; for testing engines; a smithy, with thirty forges; a lathe-room; draftsman's-room; four joiners' shops; sawing-room, with six saws at work: immense quantities of wood (oak) and iron lie about. The timber-yard contains a stock of an average worth of £6,000. Machines are here in readiness to be sent to all parts of the world, especially to New Zealand and Australia, Sweden, Austria, France, and South America."

It was only this last week that we ourselves had the pleasure of inspecting the works; but Christmas is a busy time in the Strand; and we can only offer our thanks to Mr. Measom and his Guide, for a description that has served us so well.

For the last few years declining health has prevented Mr. Hornsby taking any very active share in the business. He has, however, a worthy successor in his eldest son, who, with two younger brothers, now represent the firm. Under their good stewardship the trade has been still increasing, while the name, even in this age of competition, more than sustains its pristine repute. "A good name," says an old proverb, "is a precious ointment;" and that of Hornsby promises long to illustrate the adage.

THE FOOD OF DAIRY COWS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The treatment of the cow in the early days of English husbandry was evidently of a very rough description. In times when the advantages derived from feeding her well at all seasons was utterly disregarded—when warmth and cleanliness were deemed to be, for her, useless luxuries—when she was only kept in good condition with the duration of the grass of her pastures—when hay and straw was her only winter sustenance—need we wonder, in such days, that her breeding was equally neglected, and her diseases ascribed to all kinds of imaginary causes, such as the influence of the witch or the shrew-mouse?

It is hardly more than two centuries since we first find our English agricultural writers giving any directions for the breeding of cows. It was about the year 1669, that old Worlidge gives, with commendations, his English translation of Virgil's advice to the breeder of oxen—directions which would rather startle a modern breeder. He says:

> " ——whoe'er breeds,
> To choose well-bodye'd females must have care.
> Of the best shape the sour-lookt heifers are;
> Her head great, long her neck, and to her thigh,
> Down from her chin, her dewlaps dangling lye;
> Long-sided, all parts large, whom great feet bears,
> And under crooked horns her bristling ears;
> The whole cow fair, and visag'd like the male,
> Sweeping the ground with her long bushy tail."

The large-boned, coarse-looking cows were evidently in the highest favour with the farmers of those days; they perhaps were the best adapted to withstand the rough treatment they had then to endure. When the cows were ill, they assigned the origin of their complaints not to neglect or bad feeding, but if the disease was in the slightest degree uncommon, to very imaginary and evil causes. It was about the year 1596, that Leonard Mascal, of Plumstead, in Kent, gives evidence of what knowledge even a cattle-doctor possessed in those days; for he came to the farmer's aid in his book "On the Government of Cattle." In this book, amongst other equally wise observations, he gave them directions how "to know the difference between cattle bewitched, and other soreness." Then, with a similar credulity, the farmers of that time believed, it seems, that if a poor little shrew-mouse ran over their cow, it rendered her lame. So Mascal gravely propounds to them the following remedy:—"You shall have her to a briar growing at both ends, and draw the beast under it, and so she will recover." Then he proceeded to inform his reader that if the cow had the bloody flux, then "ye shall take a frog; cut off his left leg, and so put him alive in the beast's mouth," &c.

With such abounding ignorance, we may reasonably conclude what comfortless kind of homestead-yards and winter pastures must have existed in those days; and from the directions which ever and anon appear in the works of these early writers, it is evident that leaves, straw, and the young branches of trees were not very unfrequently the sole food on which the dairy cows had to subsist.

How refreshing it is, then, to turn from the barbarism of those days to the modern well-bred and carefully-tended herds of our time—to a period when the advantages of gentleness, skilful feeding, cleanliness, quiet, and warmth, are so generally understood! Take, for instance, the researches of Mr. Horsfall, of Burley, in Yorkshire, described in the recent number of the Journal of the Royal Agricultural Society; notice how, step by step, he shows the demands made upon the cow for her calf and her milk and the food necessary to meet that ensuing waste of her substance. To illustrate these practical questions, he experimented during rather more than 27 weeks upon six milch cows. During this time the food was weighed, its composition ascertained, and the disposal of that food traced (*Jour. Roy. Ag. Soc.*, vol. xviii. p. 156). The food these cows consumed during that period, and its composition, were as follows:—

	Per day.	Total weight of food given.	Albumen.	Starch.	Oil.	Fibre.	Minerals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Meadow hay	56	10,715	990	4,257	287	2,933	953
Rape-cake	30	5,740	1,803	2,177	611	494	171
Malt-coombs	9	1,722	411	791	51	320	88
Bran	9	1,722	246	800	96	258	100
Beans	9	1,722	464	774	34	176	53
Green food	204	39,032	862	3,074	115	1,148	541
Oat-straw	50	9,566	287	3,066	100	4,526	428
Bean-straw	12	2,296	376	725	51	594	217
Total	379	72,515	5,439 = Nitrogen 888 lbs.	15,664	1,345	10,449	2,551

The constituents of this food could only be disposed of by these cows in either the milk they yielded, the perspiration they emitted, the flesh they acquired, or the excrement they voided.

Now in this time the production of milk by six cows averaged 14 quarts per day each for 27½ weeks = 16,072 quarts, which at 41 oz. per quart = 41,184 lbs.

		lbs.
When dry or free from moisture......		5230
Butter in 16,072 quarts at 30 per 1000	=	1235
Casein „ „ 48.2 „	=	1977
Sugar of milk	=	1804
Minerals { Phosphate of lime 99 Other.......... 115 }	=	214
		5230

And in the same time they gained in weight 500 lbs., which their owner calculated to be 300 lbs. as fat, and 200 lbs. as flesh. The excrement of these cows was then examined, which amounted to 88 lbs. a day. This was examined by Professor Way, who found in it per cent.:—

Moisture	84.85
Phosphoric acid	.39
Potash	.58
Soda........................	.22
Other substances.............	13.96
	100.

Nitrogen .41 = Ammonia .49

So that from these examinations it would appear that if the nitrogen in the food of these cows equalled 888, the disposal of this was as follows:—

In the casein	316.
„ Fibrin	7.35
„ Manure	414.
The remainder consumed in perspiration	150.65
	888.

The question as to the proportion of the food necessary to keep her in store condition, and the farther proportion required by her when yielding milk, did not escape Mr. Horsfall's attention. He takes for his starting point the established opinion of his district, that 20 lbs. of meadow hay suffice for the daily maintenance of a cow of fair size in store condition, a like result being obtained from 120 lbs. of turnips per day. The six cows then required during the 27 weeks, for their *maintenance* only:—

	Albuminous matter.	Oil.	Starch, &c.	Total weight.
Hay..lbs.	2127	616	9130	22,960
Turnips..	2295	306	9100	137,760

The excess of the food given to them beyond this amount, then, was chiefly converted into milk, or meat, or the enrichment of the excreta. For the maintenance, then, of a fair-sized cow for one day in a normal state, the following elements seem adequate:—

				Mineral Ingredients.	
	Albumen.	Oil.	Starch,	Lime.	Phosphoric acid.
In 20 lbs. of hay..	1.85	.536	7.95	.90	1.11
120 „ turnips	1.98	.26	7.82	.97	1.9

"When cows are in milk, there occurs a much greater activity of the functions; they eat and drink more, evacuate more excrement, and, in all probability, spend considerably more food in respiration. Whilst the 17.60 lbs. per day dry matter in 20 lbs. of hay are found adequate for the maintenance of a cow in a store state, the six cows in milk have eaten on the average 21.37 lbs. solid matter per day during the 27½ weeks. When I have fattened cattle together with a number of milch cows of similar size, which gave on an average 8 quarts of milk per day, the whole being fed with moist steamed food, and receiving the same allowance of green food, I have found the fattening cattle refuse water, whilst the milk cows on the average drank upwards of 40 lbs. per day of water given separately. The 8 quarts of milk contain only about 17.58 lbs. of water; still in several analyses of excrement I have noticed little difference in the percentage of moisture in that from the fattening animals as compared with that from cows giving milk.

"These facts would seem to show that upwards of 20 lbs. more water were given off from the lungs and pores of the skin of a milking than of a fattening animal."

Another branch of the inquiry of the greatest practical value is the comparative real value of the dung of oxen when kept on different kinds of food. In elucidation of this most important inquiry, we have here two experiments of Mr. Horsfall, and two analyses by Mr. Way. These were made with eight cattle, the experiment being commenced in March, 1855. Mr. Horsfall tells us that "for the first six weeks after they were tied up, their food consisted of chopped straw, shells of oats, and bean straw in about equal proportions; 4 lbs. of rape-cake, 1 lb. bean-meal, ½ lb. linseed, and ½ lb. wheat ground together, and 30 lbs. swedes per day. The straw, &c., were cooked by steaming. On this food two of the heifers had gained 9 lbs. each in the month's weighing, the others 16 lbs. and 18 lbs. each per week; the average being somewhat more than 14 lbs. per week. A sample of the excrement was sent on the 26th of March to Professor Way for analyses. It contained :—

Moisture	83.81 lbs.
Organic matter.................	13.44
Sand, &c.....................	.93
Phosphate of lime	.64
Common salt	.18
Sulphate of soda and potash	.95
	99.95

Nitrogen .51 = ammonia .62.

"The yield of excrement is at the rate of about 9½ tons per year; value, 8s. 6d. per ton; or 1s. 7d. per week for each.

"My store of turnips being exhausted with March, an additional proportion of bean-straw, with the above-mentioned allowance of rape-cake, bean-meal, linseed, and wheat ground together, was supplied till the 24th of May, when a portion of meadow-grass was mixed with the straw, and by degrees the straw was discontinued; when mown grass, together with the same allowance of extra food, was given till the close of June, when the lot were of prime quality, and sold for the top market price. Up to the close of May their gain averaged over 14 lbs. per week; during June they gained something less than 14 lbs. per week. On the 29th of June a sample of excrement was sent to Professor Way, who reported its contents :—

Moisture	84.90 lbs.
Organic matter.................	11.94
Sand	.86
Phosphate of lime	1.33
Common salt	.24
Sulphate of soda and potash....	.76
	100.00

Nitrogen .94 = 1.14 ammonia.

"The yield of excrement was at the rate of 9½ tons per year, and its value in ammonia and phosphate of lime may be computed at 15s. per ton, being at the rate of 2s. 10½d. per week for each, to which the sulphate of potash will be an appreciable addition."

It is impossible to assign an adequate value to inquiries such as these; they will lead to other and still more minute investigations as to the chemistry of food—a subject whose importance has only of late years been felt by the practical farmer. Great indeed, although slow, have been the advances made in this way since those days of the witches and the shrew-mouse to which I have referred, and the present time. And if we take the experience of the last two centuries as our guide, there appears little chance of the advancing progress of agriculture being stayed. The advance made only in the present century, in the breeding and rearing of our live stock, indicates this. Few farmers now survive who remember the times of Francis Duke of Bedford, and the institution in 1798 of the Smithfield Club; but we may learn from other sources of information the fact that what was then deemed perfection in the breed and management of our live stock, would be now little regarded by the present and-far-better-informed race of England's agriculturists.

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE MECHANICAL AND CHEMICAL PRINCIPLES APPLICABLE TO DRAINAGE.

THE NESBIT TESTIMONIAL.

The concluding meeting for the present year, took place at the Club House, Bridge-street, Blackfriars, on Monday evening, December 7.

Mr. Owen Wallis presided, supported by a very large attendance of members, and subscribers to the Nesbit Testimonial. Amongst others present were Messrs. R. Baker, W. Bennett Joseph Pain, Rev. T. C. James, W. Bullock Webster, T. Hatfield, J. J. Mechi, T. E. Pawlett, J. Thomas (Bletsoe), J. Thomas (Lidlington), J. B. Spearing, L. A. Coussmaker, H. Shotter, J. Grove, G. Wilshir, J. Marshall, T. Chandler, T. Congreve, B. E. Ward, S. Sidney, C. Stokes, J. Tyler, W. Gray, G. P. Tuxford, J. Bailey Denton, C. M. Bidwell, J. Wood (Sussex), J. Wood (Croydon), J. Brown, W. Brown, J. Ploughman, W. Shaw (Coton), J. Smith (Rye), J. A. Yowl,

J. G. King, C. J. Morton, T. Scott, C. Howard (Beds), T. Twitchell, E. H. Bentall, C. J. Brickwell, G. H. Ramsay, R. de Trehonnais, W. Cheffins, J. Wells (Yorkshire), G. S. Harrison, S. Skelton, G. Hammond, W. Eve, J. Parkinson, &c., &c.

The subject for discussion, entrusted to Mr. J. C. Nesbit to introduce, was put on the card in the following terms: "The Mechanical and Chemical Principles which should properly regulate the Practice of Drainage."

On the table, in front of the Chairman, were placed a service of silver plate and a microscope, purchased by the promoters of the fund raised for the purpose of presenting a testimonial to Mr. Nesbit, for the services which he has rendered to the cause of agriculture. The service of plate—which whether for beauty of design or excellence of workmanship has not often been excelled by testimonials of a similar character—consisted of the following: A tea and coffee service, a very large salver, two smaller salvers, a cake-basket, an egg-frame, a butter-cooler, four tankards, a mahogany case containing twelve pairs of silver and dessert knives and forks with carved pearl handles, and about a hundred spoons and forks. The whole was supplied by Mr. Durrant, of No. 40, Cheapside. On the principal salver is engraved the following inscription, explanatory of the object of the presentation:—

"Presented, together with a Service of Plate
and a Microscope,
to
Mr. J. C. Nesbit, F. C. S., *&c., &c.,*
Principal of the Agricultural and Chemical College,
Kennington,
By Members of the Central Farmers' Club, and others
interested in the Cultivation of the Soil,
In appreciation of the valuable services rendered
by him to the Cause of Agriculture.
December 7th, 1857."

It may be added that the microscope, by Ross, was an admirable specimen of that species of instrument, and powerful enough to admit of the reading of the sixty-thousandth part of an inch.

The **Chairman** in opening the proceedings said—Gentlemen, before we go to the discussion of the evening, I have a very agreeable and pleasing duty to perform on your behalf, namely, that of presenting to Mr. Nesbit the handsome testimonial which you see on the table, as a mark of our appreciation of the services rendered by him to the agricultural community of this country (cheers). Mr. Nesbit has, as you are aware, on several occasions introduced discussions in this room, of a most valuable and instructive character; and whenever he has been amongst us he has answered any questions which may have been put to him, relative to agricultural subjects, most unreservedly and kindly (renewed cheers). Neither have his services been confined to the members of this club. I believe there is scarcely an agricultural club of any importance in the country, which has not availed itself of the same source of information, and all have, no doubt, profited by the instruction afforded to them. At the close of the last discussion which was introduced here by Mr. Nesbit—it was, I think, in April last year—it occurred to several members of the club that the time had come when the acknowledgment of the services thus rendered should assume some more substantial form than the customary and matter-of-course one of a vote of thanks. It was suggested that a subscription should be set on foot, with the view of purchasing a suitable testimonial; and this suggestion was immediately acted upon (cheers). Although the design originated with members of this club, it was hoped that the subscription would not be confined to them, and I am happy to say that that hope has not been disappointed (Hear, hear). The very handsome sum of £280 has been collected throughout the country on account of the Testimonial Fund. Of this sum I believe about £12 has been disbursed in defraying unavoidable expenses: the remainder has been expended in purchasing the very handsome and useful service of plate, and the very beautiful and powerful microscope, which are now on the table. This testimonial appears to me the more gratifying because it is an additional proof to the many which we have happily seen in the present age, that Science is no longer looked upon with doubt and distrust (Hear, hear), but is generally recognised as the handmaid of Practice, and its safest and surest guide. (Hear, hear.) Gentlemen, I will not take up any more of your time, knowing that many of you are anxious to visit Baker-street in the course of this evening, and knowing, too, that you are all desirous of hearing the remarks which Mr. Nesbit has to make in introducing the approaching discussion. I will now, with your permission, therefore, in the name and on behalf of the numerous subscribers to this handsome testimonial, request Mr. Nesbit's acceptance of it, as a mark of our good will and grateful feelings towards him; only adding the expression of a sincere hope that he may be enabled to enjoy what is now presented to him, and that his life may long be spared, not only for the sake of his family and friends, but also that he may continue to labour in the great field of science (loud cheers).

Mr. **Nesbit**, who on rising was very cordially received, spoke as follows: Mr. Chairman and gentleman, I assure you it is with very considerable difficulty that I can even attempt to tell you how deeply I appreciate the kind and munificent present which you have bestowed upon me this evening. I accept it as a sign that the farmers of this country no longer think that science can be of no assistance to them, but are disposed to take science as an aid by which the art of agriculture may be improved (Hear, hear). Although, as a mark of personal respect for myself, I receive this testimonial with as strong a feeling of gratification as any man could possibly entertain under similar circumstances, and although I cherish a feeling of deep gratitude to those friends who have come forward to express their opinion as to the humble services which I have rendered to the cause of agriculture, I yet assign to this testimonial a much higher meaning than that; I regard it as a testimonial from the agricultural public to the scientific body. I view it not merely as an acknowledgment of services which I myself may have rendered, but also as a recognition on the part of agriculturists generally of the services of all who have been endeavouring to apply science to the advancement of agriculture (cheers). It is, therefore, gentlemen, not in my own name alone that I return thanks for the beautiful testimonial which you have presented to me, I return thanks in the name of all who have been fellow-workers with myself, of whom there are many both in England and abroad. I return thanks, I say, in their name as well as my own, for this testimony from the art of agriculture to the practice of science (cheers). I would only say in conclusion that I feel deeply indebted to all the subscribers for the very handsome testimonial which has just been presented to me, which I trust will cause me to redouble my efforts for the advancement of agriculture (much cheering).

The **Chairman** said they would now proceed to the discussion of the evening. He was quite sure they would all be as much edified by Mr. Nesbit's remarks on that occasion as they had been by his previous efforts; and, without taking up any more time, he would now call upon that gentleman to open the discussion.

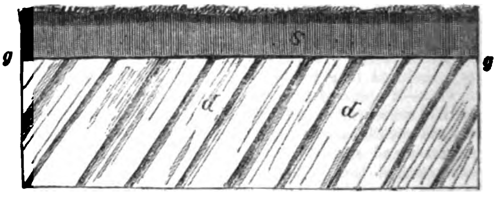
Mr. **Nesbit** then rose and said: Mr. Chairman and Gentlemen,—I really feel that I am placed in a position of some difficulty this evening. There are so many practical drainers around me, who have been working in the soil with deep drains and shallow drains, and every variety of drains, that I cannot help feeling that one who does not even profess to be a practical drainer, might by some be fairly considered to be presumptuous in appearing before such an assembly. We have had many excellent lectures on this subject, including the philosophical lectures of Mr. Parkes and the able disquisitions of Mr. Bailey Denton. We have our deep drainers and we have our shallow drainers, Mr. Bailey Denton representing the one on this occasion, and Mr. Bullock Webster the other; and I must declare at once that I do not belong to either class. I come before you to-night, not to advocate deep draining or shallow draining, but to endeavour to deduce from the nature of the soil itself the laws which ought to govern the art of draining in different localities. Beyond that I do not presume to go. I shall lay down certain principles, and leave those who have the practical management of drainage operations, so far as they may find these principles consistent with fact, to modify their practice by them. Now, in the first place, setting aside the different modes of carrying on drainage, let us look for a moment at the difference between a drained and an undrained soil. Let me remark, at the outset, that I have no wish to ignore what has been done by others in relation to this subject; but I feel that, in a lecture like that which I have undertaken to give, I ought to begin, as it were, with first principles, and not to take everything for granted. I am perfectly well aware that many gentlemen now present are at least as well acquainted as myself with what I am now about to state; but nevertheless I must, for the purpose of clearing the ground, commence by laying down elementary principles. Now what is the difference, chemically, between a drained and an undrained soil? An undrained soil is, I apprehend, not simply a soil in which water is present, but a soil in which water is present to an abnormal extent—to an extent that will injure the vegetation. The question then arises, how does an excess of water injure the condition of the soil? If you have a large quantity of water very near the surface of the soil, that water by its evaporation produces cold; the land is, in consequence of being undrained, very much colder than it otherwise would be; in other words, the average temperature of the soil, throughout the year, is very much lower than it would be, if the water did not approach so near the surface. That is one case. We will take another—that in which the water-level does not come to the top of the land, but so near to it, that the mere capillary attraction of the soil will bring the water to the surface. Here you have a second case of injury from excess of water, though not so bad a one as the first. Now, in order to illustrate what I mean by "capillary attraction," I will just set at work a little instrument which I have on the table, the action of which will proceed while I am speaking. I have here, in a glass tube, a quantity of dry sand. The bottom of the tube is covered with a small piece of linen, to retain the sand in the tube. I have also a little cup containing water. I will now insert the bottom of the glass tube in the vessel of water. You will observe that the water rises through the pores of the sand much higher than the level of the water in the cup. The power which causes the water to rise is called "capillary attraction"—that is, the attraction of minute tubes. [The water rose in the tube many inches above the level of the water in the cup.] Now, what is styled "capillary attraction" is simply the power which all soil has, under certain circumstances, of taking up water by attraction beyond the ordinary level, into the pores of the soil itself. Capillary attraction has a very important bearing on the question of drainage, as respects both the depth and distance of collateral drains. I wish to impress upon you this point—that, where the soil is exceedingly fine, where the pores of the soil are very minute, capillary attraction will raise the water much higher than it will where the soil is of a gravelly and coarse character. In the more porous soils, water will not rise so high as in soils of an opposite description. It is a well-known fact—a fact which might be exhibited by means of glass tubes drawn out to different degrees of fineness—that the finer the tubes or pores, the higher water will ascend in them. It must, therefore, be borne in mind that the capillary attraction of the soil will necessarily exert a considerable influence on its condition. This ought to affect the judgment of every man who puts a drain into the land, because, in proportion as the capillary attraction of different soils varies in force and amount, so the modes of draining those soils properly and effectually must vary likewise. Another point of considerable importance is this—that, in drained land, not only have you got rid of the evaporation of the water from the surface of the soil, but the soil at the surface, being warmed by the rays of the sun and by the diffused heat of day, warms the water that falls on the soil; and that water, in passing downwards, leaves its heat in the soil. You see, therefore, that, if a soil be capable of deep drainage, the deeper the drain, within certain limits, the greater will be the amount of soil heated by the water that comes from the surface. There is a very important point relating to the distance of drains, upon which I shall say a few words hereafter. Another effect presents itself here—namely, that, after the water has entered the soil, the air must follow it. So that you have two courses of action. You have the water heated, particularly in summer weather, passing downwards, and warming the soil; and you have the warm air following afterwards, and also warming the soil. Besides that, the drainage has a distinct action in disintegrating the mineral matters of the soil for the purposes of the plant, and in oxidizing the vegetable matters, and furnishing means by which the process of vegetation may take place more rapidly than it otherwise would do. Thus good drainage replaces rank weeds and grasses by grasses of finer quality and more nutritious properties. [Mr. Nesbit here illustrated the fact of the retention of heat in soils by pouring heated water on some soil in a glass vessel. The hot water, after passing through eighteen inches of soil, issued therefrom quite cold, the heat of the water being retained in the soil.] It is quite clear that, in such a case, the heat left in the soil must have warmed the roots of the plants growing in that soil. I am obliged of course to use, in performing this experiment, a rather coarse species of soil, because I must make, as it were, a week's rain pass through in a very short space of time. In the soils themselves to which I have been referring, the action is, of course, not so rapid; but the principle is the same.

Mr. **Mechi**: The fall of rain in the first instance expels the air?

Mr. **Nesbit**: When water falls on dry and porous soils, it first, as it descends, drives out the air, and is then itself followed by air from above. The question of deep and shallow drainage is one which you will have to determine, in each case, upon its own merits (Hear, hear). The experiments which I have to exhibit will, however, evince clearly that there is no one decided depth, and no one decided width, at which it can be laid down as a rule that all draining should be carried on, but that draining must vary according to the circumstances and condition of the soil (Hear, hear). What I wished to do was to illustrate the fact that when water is heated at the surface, and then passes downwards to a drain below, it issues, in spring and summer, very much cooler.

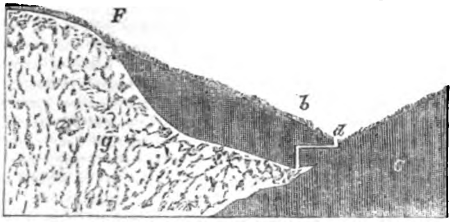
A **Member**: Is that regular soil?

Mr. **Nesbit**: It is a gravelly soil. You see, then, very clearly that, so far as chemical principles are concerned, we have here the passage of the water through the soil and the alternative passage of air; and thus we have the irrigation and the aëration of the soil accomplished in the most beneficial manner by means of drainage. If you now look to this illustration of capillary attraction, you will see that the water has risen some four or five inches, in apparent opposition to the principle of gravitation. Well, now, before I proceed to speak of simple, regular drainage at so many feet distant, such drainage as uniformly-pervious soils must require, let me refer to a few facts in connection with the drainage of springs, and of certain particular soils in various localities. The case of the drainage of springs is one that ought, perhaps, to be considered separately from that of the ordinary gridiron draining, as it has been termed; but it is very often found that, by one or two drains, one can set free a very large tract of land from the water that comes in from a higher level. I have here [referring to some diagrams suspended against the wall] illustrations of a few cases to which I wish to allude. The first case to which I shall allude is the most ordinary one. It is one which very frequently occurs in the West of England.



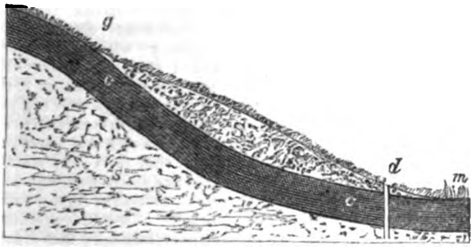
[Diagram No. 1.]

Here you have the rocks themselves upon which the vegetable soil rests stratified very nearly vertically (as represented in Diagram No. 1); you have a pan *g, g,* almost impervious to water; and upon that pan you have vegetable earth. Now, instead of this soil requiring to be drained in the ordinary way, the subsoil plough is, in fact, all that is wanted. If the line *g g* be cut through by the subsoil plough or otherwise, at proper intervals, the land will be drained by the percolation of the water through the fissures of the rock. It must be recollected that the plough must pass transversely to the stratification. You just plough the subsoil, so as to break the pan; and if my friend Mr. Robert Smith were here, he would tell you that a very considerable portion of Exmoor has been drained by him in this manner. Where the upper surface of the nearly vertically-stratified rock is too deep to be touched by the subsoil plough, the simple breaking-up of its outcrop at suitable depths and distances will often effect the same object. That is the first case. Another case is that of a hill of porous character, with a valley consisting of clay, and the water continually running over the edge of the clay where it abuts upon the gravel or other porous soil at the point *F*, as represented in diagram No. 2.



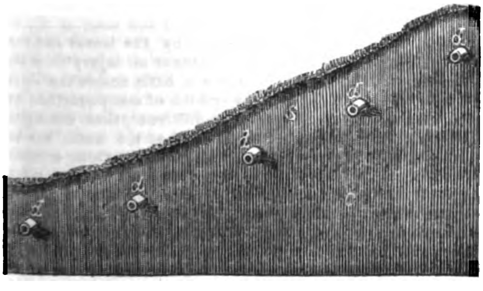
[Diagram No. 2].

Now the plan of Elkington was simply to make an outlet in the bottom of the valley, to cut towards the hill, and at the proper point to bore down until he tapped the porous soil *g*. The water immediately issued forth, the level was reduced below the junction *F*, and the whole land between *F* and *d* was consequently laid dry. His great point was to hit the porous gravel at the point *b*, as he might have bored to any depth at *d* without any effect. By operations of this kind he often succeeded in laying dry very considerable tracts of land. Take another case diagram No. 3 represents a porous soil resting on clay.



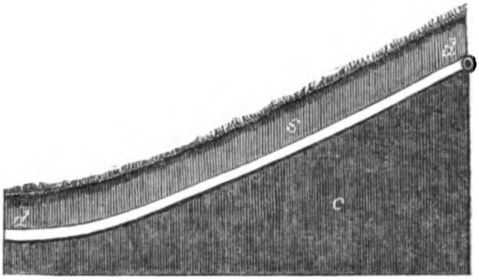
[Diagram No. 3]

Here is a stratum of gravel or porous soil, resting on clay. All the water which falls between the points *g* and *m* issues at *m*, and makes the subjacent land beyond *m* wet and swampy. A cutting at the point *d*, simply into the clay, where there is an outfall, will cut off all the water between *g* and *d*. If there be a porous stratum below the clay, even without an outfall, the land can be drained by cutting through the clay to the porous subsoil, into which the water will empty itself. I believe I could point to gentlemen in this room, who have adopted this plan of proceeding in many instances. Many similar cases of juxtaposition of porous and retentive soils, where similar means may be made use of, will occur to every gentleman present. We now come to general, ordinary drainage. And the first question which here presents itself is, whether the drains ought to be on the greatest slant, or horizontal, or at some angle between. I have here two diagrams which will serve to illustrate this point. Diagram No. 4 represents a section of a hill, with drains running horizontally—that is to say, at right-angles to the fall of the hill.



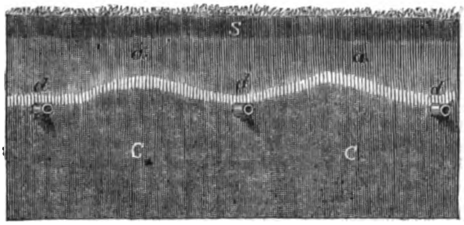
[Diagram No. 4.]

Now it is quite clear that each of these drains only acts in a horizontal direction. Each drain is acting separately on a small piece of land: it cannot act upon the general mass of the land below it. On the other hand, where there is a drain running down the hill—that is, in the line of quickest descent—that drain will act upon the whole of the hill, from the top to the bottom.



[Diagram No. 5.]

So that it is perfectly clear that you apply your labour and time and money to the greatest advantage when you drain on the line of quickest descent. There may, however, be some exceptional cases where a deviation at some angle from the line of quickest descent may, owing to local peculiarities, be necessary. These cases cannot affect the general rule. These are principles which I am attempting to lay down distinctly for consideration. Of course they are open to discussion; and I hope myself to obtain a great deal of information, though I think that what I have said is for the most part sufficiently simple. Another question to be considered is, What should be the distance of the drains apart? On this point, I wish to illustrate that the different capillary attraction of various soils, and their rates of resistance to the passage of a certain amount of water in a given time, must be distinctly taken into account, not only in regulating the depth of drains, but also their distance. This applies more particularly to porous soils, which have a water-level more or less near the surface. It does not equally apply to those real clay or other retentive soils having no real water-level, which, in fact, give no trace of water, even when penetrated to the depth of fifty or one hundred feet.



[Diagram No. 6.]

In diagram No. 6, *S* represents the surface-soil, *a a* the subsoil, *d d* the drains, and *C C* the water-bearing soil beneath the drains. According to the varying degrees of fineness of the particles of the soil, and consequently the resistance to the passage of the water, so will the water rise higher in the soil between the drains; the water-level in drained lands not being a horizontal plane, but an undulating or curved surface, the height of which, above and between the drains, must vary according to the mechanical fineness and condition of the soil. The light line passing the drains represents the water-level. From these facts it would appear that the greater the distance of drains apart, the higher will be the water-level between them; and that this ought to be taken into consideration by practical men in their practice of drainage, in respect to both depth and distance. The amount of the resistance of different soils to the passage of water in a given time has, in my opinion, not yet been taken into sufficient account. In continuation: I mentioned before that if the water came near the surface, and evaporated, it must produce cold. Well now, gentlemen, suppose you had to drain a piece of land, and this [pointing to the light line in the diagram] was the water-level, where actual water existed as water, the land would take up by capillary attraction many inches of water that would not run out of it afterwards. It is quite clear that that would bring it within a certain distance from the surface; but it is equally clear that, if this water comes too near the surface, and evaporates, it will produce cold. The consideration of the proper depth of the drains, then, appears to depend partly on the degree of power of the soil to raise the water beyond the water-level; and, in order that a soil may be a workable soil, the consideration of the proper depth of the drains must be determined with reference to the force which the soil exerts in raising the water from below, as well as to the resistance, *in time*, which it offers to the passage of the water through it. Now there is one point of very considerable interest, the importance of which has I think been too much overlooked, viz., as to the depth to which water will penetrate into the earth or soil. Are there no limits either as to distance or time? What answer should we give to the question—"How far will water penetrate into soils?" Upon a careful consideration of this question, I think that the following answer will, in terms sufficiently simple, express a general law which governs all cases: "*Until the resistance to its downward passage equals the pressure from above.*" If the soil be porous, the water from above will pass down until it reaches the water-level; and when it reaches the water-level, it meets with opposition and begins to rise. But where is the point in a clay-soil—a homogeneous clay-soil—at which the water will issue? We cannot talk of a water-level in clays where no water can be found, even at a depth of fifty or sixty feet. But some soils like these are those precisely which most require draining from surface-water. There is a depth in these soils beyond which surface-water will not penetrate; and this depth will vary with the varying fineness and tenacity of the soil. These considerations ought, therefore, to exert their proper influence on the art of the practical drainer. Let me here observe that a vast variety of the soils which are called by farmers clay-soils, are not clay-soils. If you show me a soil which requires an admixture of forty or fifty per cent. of sand before it will make a brick, I will admit that to be a clay-soil; but when a soil will make a brick without any admixture of sand, I cannot admit it to be a real clay-soil. The question of drainage therefore, we see, in depth and distance, depends on the fineness of the particles and pores of the soil; the amount of capillary attraction, and last, though not least, the amount of resistance a soil offers to the passage of *a given quantity of water in a given time*. Let me here remark that one great element appears to me to have been very much neglected in all discussions on drainage. I say this without intending any disparagement of the admirable lectures which we have had on this question. I mean that *this element of time* has not been sufficiently taken into consideration. A friend of mine, who is present, has tried some experiments for me, illustrating this subject. He has got a clay on the top of one of his hilly farms, in which he has sunk fifty feet without getting any water. At my request, some trial-holes five or six feet deep were sunk in this clay, the upper rim of the holes being a little raised, to prevent water entering directly at the surface. The object in view was to find where and when the surface-water would enter the pits, under rain-falls of different quantities. Under these conditions it was found that, when there fell a large amounts of rain in a short time, the water began to ooze into the pits about one foot from the surface, the resistance to the further passage of the water downwards being at that point sufficient to prevent its further descent with sufficient rapidity. On the other hand, when the rain-fall extended over a much greater length of time, and was consequently more gradual, the water was found to penetrate to the depth of two feet, which was the lowest depth observed. I think a fair deduction from these experiments must be allowed by all to be, that "the *degree* of resistance of a soil to the passage of a given *quantity* of water in a given time ought to have its proper influence in regulating both the depth and the distance of drains." Another conclusion which I think we must inevitably draw from these facts is, that the assertion that deep drains always run the first is not always correct. If this clay-land had been drained at one foot depth and at two feet depth, it is apparent that, under the condition of a rapid and heavy fall of rain, the drain at one foot deep would have run the first, and that, besides, a considerable quantity of water would have also escaped by simply running over the surface of the land into the nearest ditches. The effect of varying amount of rain-fall in a given time is easily illustrated. I have here a glass vessel filled with soil, having three apertures—one near the bottom, one in the middle, and one some distance from the top. If I pour in water at such a rate that the pores of the soil will permit it to percolate through them as fast as I pour in, the water will descend to the bottom, will then rise, and will issue from the lowest opening first. If I pour in more water than the lowest aperture or drain can discharge, the water will rise in the soil, and at length issues at the middle drain. If I continue still to pour in an increasing quantity, the water will rise to the top drain; and all three will discharge their respective quantities of water. If I now discontinue pouring in water, you will observe that the upper drain first ceases, then the middle one, and subsequently the last [Experiment performed]. This is the ordinary state and condition of porous soils. It is, however, as before stated, different in those soils which offer greater resistance to the passage of water through their pores. Even with this same soil, in which you have seen the lower drain run first, the fact would be reversed if I were to pour in water faster than the soil could permit it to percolate. I will now pour in the water with some rapidity, when you will see the *upper drain run first* [Experiment performed] (cheers). This last case is strictly analogous to the results obtained by my friend Mr. Hatfield, where he observed that the heaviest rain issued at the shallowest depth. It is, therefore, a question of the rapidity with which water will percolate through the soil; and I state it to be my deliberate opinion that, unless you pay sufficient attention to *the time* which water will occupy in going through the soil, you cannot drain upon scientific principles. There is another point, gentlemen, which I wish to introduce. It is one that I approach with great diffidence; but I must say that it is just possible to have a mania for drainage, and it has often occurred to me that in some cases it would be well if instead of further draining there were irrigation (Hear, hear). I would suggest that there is such a thing as *natural* overdrainage; that I have seen such a thing, in such soils as the sands resting on chalk, in the district between Bury St. Edmund's and Brandon in Suffolk. Has there been no such thing as overdraining *artificially?* I would submit for the consideration of practical farmers the inquiry, whether there be not many cases in which the land of this country is drained too much. It is a well-known fact—I cannot doubt that it is well-known to most present—that if you have a piece of fallow land exposed to the action of the atmosphere, and have another piece of land under crop (say vetches or winter tares), when you come to plough them up you will find the latter quite dry and hard, compared with the former (Hear, hear). This difference is accounted for by the fact that every leaf of the vetch has its little root or tube with ramifications running downward into the soil, and that all the moisture of the soil is brought up by the roots to the surface, where it evaporates by the leaves of the plant. This may perhaps account for the difficulty often experienced in getting a good crop of turnips after tares. But does not the evaporation from the leaf and the absorption likewise of water by the roots of the plants, as in the case of grass and meadow lands, seem to point to the necessity of more water than in ordinary arable land? And in the case of the constant evaporation from grass-land by the leaves and roots, may not the water level, without danger of injury from stagnant water, be allowed to approach a little nearer the surface than in arable-land? It is the opinion of many practical men, and I submit it to you with great diffidence, that some grass-lands may have been *over-drained*—that the water has been taken away too deeply from them. It is one thing to remove an excess of water; it is another thing to take away what is necessary for crops; and therefore any invariable depth—any depth, that is, like the laws of the Medes and Persians, to be observed in all cases, and in all varieties of soil—is, in my judgment, founded in error (Hear, hear). Well, gentlemen, it was not my intention to deliver a long lecture this evening, but simply to present the points which I have laid before you. I have spoken of the rate at which water will descend through the soil. That is a question which must be determined by actual trial and experiment before you can arrive at any conclusion, either as to depth or as to distance. Time is a most important element, and ought not to be forgotten. Capillary attraction is also most important. I leave it for your decision whether in grass lands the water may not be allowed to approach nearer the surface than in arable land. I shall be happy to learn from many gentlemen whom I see before me; for I know that they have had a great deal to do practically with the art of draining. I have endeavoured to lay down certain principles which appear to me to be correct, and without detaining the meeting longer, I now leave others to enlarge upon the practice of draining (Cheers).

Mr. MECHI: What is your opinion with respect to distance in the case of stiff clays?

Mr. NESBIT: I do not believe depth can ever fully compensate for undue distance.

Mr. MECHI (of Tiptree) said: It was now ten years since he first began to drain, and he had cut altogether, probably, a hundred miles of drains, under the advice of Mr. Viall, a well-known agriculturist in Suffolk. As they were no doubt aware, he had at first made his drains 12 feet apart and 2 feet 8 inches deep, and put stone at the bottom (for which his friend Mr. Pain had laughed at him) and the pipes at the top. That was on a very tenacious plastic yellow clay, almost like birdlime, with a great deal of iron, but no lime. Subsequently he had drained other lands to a considerable extent 4 and 5 feet deep, at intervals varying from 28 to 50 feet, still on the same kind of clay. After ten years' practical experience on that land, his labourers were now able to form an opinion upon the comparative value of the drainage; and they told him, and he himself believed it from his own observation, that they could always plough easier and work with one or two harrowings less on land drained 12 feet apart and 2 feet 8 inches deep, than on land drained four or five feet deep at wider distances. (Hear, hear.) He had taken the trouble to cut across these drains occasionally, for the purpose of noticing the action of the water, and he found that the stones, which were put in in very small quantities, were perfectly clean, and the pipes were never called upon to take in any water (a laugh). But, owing to the ventilation of that soil, or to some circumstance which he could not perfectly explain, there was an equality in the crops, and an evenness in the yield, both on the furrows and the other parts of the land, that afforded unmistakeable evidence of thorough drainage. Having read Mr. Parkes's paper, and feeling the jeers of some of his Bedfordshire friends, he was, at one time, inclined to think that he had done wrong; but he was now convinced that the distance between the drains was a most important element on these soils. He wished to guard himself to that extent, because he had drained on other soils of a more friable character six feet deep, and there the drainage had been very different from that on the yellow homogeneous soil, free from lime, but containing a large quantity of iron, which he had mentioned. True, the drainage cost £10 an acre; but even if it were more, it would have been very profitable to him. Indeed, it had been profitable, as it was; and to this day he believed it was the best drainage he had ever executed—an opinion which was not confined to himself, but was shared in by all who had seen it. One subject which Mr. Nesbit, in his able lecture, had not touched upon, was the necessity for having open furrows on these kinds of soils. His (Mr. Mechi's) experience, and that of many others, was that during the winter open furrows were of advantage, and acted occasionally as drains, although the other drains might be running abundantly. In order to test that point, he had left an acre in each field on the flat; the rest being the ordinary furrow, at seven feet apart. Now, he was free to confess that, contrary to his own expectations, when the land was ploughed a year or two afterwards, he found that, where it had been laid on the flat, it was of a more homogeneous and less friable character than where the furrows existed (Hear, hear). He was there to speak the truth, and not to advance any mere crotchet of his own; and he did believe that the ventilation of homogeneous soils was a very important matter (Hear). He knew practically, as a horticulturist, that, if he wanted to grow roots or plants on such soils, he must take the ventilation or circulation of the air below into account; and he apprehended that the pipes which he placed on the top of the stones had produced very beneficial results. That fact, then, he commended to the consideration of his friend Mr. Bennett (a laugh). When he drained deeper on other soils, he did so for this reason—that he was a tenant on part of the land. and was not sure how long he might continue to be so: he therefore drained four or five feet down in the strong clays, at intervals of thirty, forty, and fifty feet apart. That drainage had turned out to be very profitable, and the crops were very good, though he readily admitted that the land was not in so satisfactory a condition as the land which he had treated on the other method of twelve feet apart, and two feet eight inches deep. With regard to spring drainage, he had certainly some drains twelve feet deep; and he thought there could be no doubt that, on friable soils, they must cut off the spring at the lowest point, in order to prevent the water from rising, and saturating the soil. He would merely observe, in conclusion, that not to drain the strong, tenacious clays, would be a most ruinous thing to British agriculture.

Mr. R. BAKER (of Writtle) congratulated the meeting upon having had the subject treated in so purely scientific a manner by Mr. Nesbit. Hitherto, when it had occupied their attention in that room, professional drainers had come there, and not unnaturally advocated the particular systems which they had found best adapted to their own localities; but it had been the object of Mr. Nesbit to instruct them as far as he could scientifically, with regard to the principles on which drainage ought to be applied to various descriptions of soil. Upon all occasions there seemed to have been a great diversity of opinion on this subject. Some persons lived in districts where there was a retentive soil on the surface, and a porous soil below; whilst others resided in districts where the porous soil was above and the retentive soil below. Of course, therefore, the process of drainage in these localities would be extremely dissimilar. Nature had so arranged it that in geological strata we constantly found a porous surface with a retentive subsoil, or a retentive surface with a porous subsoil; but neither continued for any great depth without reaching the other. Thus the order of Nature was preserved, and sufficient moisture was retained for the growth of vegetables for the use of man. Now, the process of drainage must, as Mr. Nesbit said, vary according to circumstances. Wherever there was a porous subsoil continued from a valley to a hill the water would always be endeavouring to escape upwards; consequently, in all such cases, the system of deep drainage must be pursued, in order to intercept the water at the lowest point before it reached the surface. That was one description of drainage. Another description was that to which Mr. Mechi had referred. He (Mr. Baker) had had some experience in drainage; but chiefly upon land where the retentive subsoil was near the surface, and he found that a certain depth of drainage on a homogeneous clay, at suitable distances—say 5 or 6 yards—was the most beneficial. He made his rains 6 yards apart, and 30 inches deep; and he was engaged on one occasion in draining a field according to this system, when the *Times* Commissioners paid him a visit—their object being apparently rather to condemn than approve of what they saw. When these gentleman entered the field he was draining at a depth of 30 inches. One of them asking him what he was doing. He replied, "Draining." "Oh, dear, no!" was the rejoinder, "you are not draining. nor making an attempt to drain." He (Mr. Baker) ventured to ask, "Why?" "Because you are not going deep enough. You should put in your drains 4 or 5 feet deep, instead of 2½ feet deep." In answer to that, all he (Mr. Baker) said was, that if a hole were sunk in that soil to the depth of 4 or 5 feet, and filled with water, there was not a hydraulic machine in London that would force it into the drain. He then made a drain 3 feet deep, and cut a parallel drain exactly 1 yard from it, but leaving the parallel without any opening except what it possessed from percolation. It was filled on Friday night, and on Monday it had only sunk 1 foot, and the water was percolating from the ditch in a manner which convinced him that it had never entered the pores of the subsoil. He then proceeded to drain the remaining portion of this field. The largest part was drained 3 feet deep, with pipes, and filled up in the ordinary way. Another portion was drained 4 feet deep; a third portion in that *execrable* mode which had been so much condemned in Essex, of using wood and straw; and a fourth with a common mole-plough. There was the field to this day, and he defied any person to tell where one system was adopted, and where another.

Mr. MECHI: Did the crops show any difference?

Mr. BAKER never observed any difference in them. With regard to the running of the lower drains first, of which Mr. Nesbit had favoured them with some experiments, he would observe that those experiments, though undoubtedly very interesting, proved nothing. Mr. Nesbit had adopted gravel for his purpose, and every one knew that water would pass through gravel to any depth. In fact, if they all had soils of that description, they would never require any artificial drainage, for the land would drain itself. The water would go down until it met with resistance. By capillary attraction the water would rise to the soil above, and the result would be that the same process would take place as Mr. Nesbit had exhibited with his tube. He had no wish to contradict Mr. Nesbit, because he was sure every one present felt indebted to him for the able and scientific remarks he had addressed to them that evening. (Hear, hear.) But he had constantly found that theory did not constitute practice, nor did practice always corroborate theory. Unless it could be shown that the particular circumstances of the soil, the quality of the subsoil, the position of the drains, their depth and distance apart, always corresponded, they could not arrive at any correct conclusion. In fact, the circumstances attendant on draining operations were in no case ever alike. (Hear, hear.) Mr. Mechi had certainly tried all the different systems. He first put stones below and the pipes at the top of the drain, which many persons thought absurd. Some one had told him that water would rise through the stones, be beautifully filtrated, and pass through the pipes (laughter)! He then changed his plan, and drained in a manner that he had not mentioned to-night. The pipes were placed at the bottom of the drains, and some of his neighbours on seeing them expressed their doubts respecting the purpose for which they had been put there, and imagined that as some of them pointed upwards they were intended to catch the rain (laughter). But he (Mr. Baker) had no desire to be too hard upon his friend Mr. Mechi, who had certainly been a very effective engineer, and contributed much towards making the subject of drainage familiar to the British farmer. His efforts had been attended with a great deal of good, and although he might not have cut very keenly himself, he had proved a capital whetstone for other men's minds. (Hear, hear, and laughter.) Mr. Nesbit had told them, and he (Mr. Baker) wished them to adopt it as a principle, that no depth of drain would compensate for distance.

Mr. MECHI: On certain soils.

Mr. BAKER: If they were draining a retentive soil, with a porous soil below, they could not go too deep, because the water had not the power to escape upwards. If they were draining a thoroughly homogeneous soil, they might depend upon it they would gain nothing by going deep; and provided they went deep enough to protect the drain from injury, that was sufficient. As he had before remarked, different systems must be applied to different localities; the same method would not answer under all circumstances (Hear, hear). He himself had been draining considerably during the present year, and had used Fowler's plough for putting in the pipes. Upon that system he had drained seventeen acres of land; and he believed that there was no other mode—not even the spade—by which draining could be so effectually accomplished, for it not only drained, but opened the soil. The drains worked remarkably well, and the pipes answered better than if they were put in by hand. In saying this, he merely gave that method the meed of praise which was its due; and he would only observe, in conclusion, that it would not do in these matters to rely too much upon theory. A theory might be very good under one set of circumstances, but very bad under another.

Mr. MECHI denied that any part of his land had been re-drained, or that he was expecting the water to rise up to the pipes (laughter). He had simply used the pipes with a view to ventilating the soil, and as the cheapest method of preventing the yellow birdlime-like soil from sinking between the stones. He wished to add that he had drained very deep on stiff clay soils. When he irrigated the land in summer with liquid manure, he made the drains 5 feet deep, and on these tenacious soils the drains ran from the effects of irrigation at that depth.

A MEMBER: Have you ever drained at 5 feet?

Mr. MECHI had drained 40 acres 5 feet deep. In one field the drains were 23 feet apart, in another 40, and another 50. They all paid well, but the land did not look so kindly, nor pay so well, as the other part.

Mr. BAILEY DENTON (of Stevenage) was s was sorry to find that his friend Mr. Mechi was still wavering (a Voice: "He is decided"). He could account for the circumstance, however, when he recollected that he was comparing drains at 50 feet intervals 5 feet deep, with drains at 12 feet intervals and 2 feet 8 inches deep. Now, he should like Mr. Mechi to inform him whether draining four or five feet deep, at intervals of twelve or eighteen feet, would not have ameliorated the soil to the full depth of the drains and to an equal extent with the less depth and the nearer intervals. There might be excess in all things, and he thought that in this case Mr. Mechi had run from one extreme to another. He was sure he should not be charged with any discourtesy if he said that there were several facts, or assumed facts, contained in Mr. Nesbit's lecture, to which he could not give his assent. He observed that that gentleman had adopted the old trite illusion that there was no water level in clays; and had also alluded to the case of a well of which he had heard his friend Mr. Bullock Webster speak before to-day. Mr. Nesbit said that water would not accumulate in a well. Now the simple answer to this was, that a well was a hole pierced in the soil, and could only have any effect upon the space immediately around it, which was not sufficient to fill it. What was the object of draining? The perfect aëration of the soil. When the soil had been uniformly aërated from one drain to another, the water as regularly descended—for this reason, that it was ust 817 times heavier than the air which was displaced by it. The level of the drains then became the level of standing water. That was one of the principal points in drainage, and it disposed at once of the illusion that a well was any criterion of a water level. They knew from observation that deep drains ran before shallow in all cases (A voice, "No, no.") Excuse him, he would repeat that deep drains, under equal circumstances, always ran before shallow.

A MEMBER.—Not on a clay soil.

Mr. B. DENTON.—It was not mere assertion that would decide the point; and, if he had expressed himself decidedly upon that subject, it was not from any dogmatic opinion of his own, but because he was sure of the accuracy of what he had said, as the result of a most minute and careful examination of the facts. Mr. Thompson, of Moat Hall, has most beautifully and conclusively explained the cause of deep drains running before shallow ones. Contradiction would not dispose of the question. Truth must, in the end, prevail; and what he had stated was the truth. Another point to which he would refer was the idea which had taken possession of some minds, with reference to Elkington's system of drainage. That was a system which certainly had an existence in the practise of Elkington, and a prize of £1,000 had been given to Elkington for its discovery; but it had not existed since (an expression of dissent). He repeated, that both as to principle and system it had not practically existed since Elkington's time. That might be regarded as a bold assertion, but he waited to be informed that the principle had been confirmed by subsequent practice. With regard to the swallow-hole system, nothing could be more lazy than that, except under peculiar circumstances. There were no doubt cases of pans near the earth's surface for which there was no outlet. Of course in such cases they might adopt this expedient; but rather than lay that down as a "system of drainage," he would blot it out from the practice of agriculture. He could mention if necessary several instances in Yorkshire, Hertfordshire, and other parts of England, where the swallow-hole method had been adopted; and if it were possible to ride in a balloon over the land so treated, they might in every case fix upon the particular places where it had been applied. They were black spots upon the earth's surface, regular scabs, owing to the non-existence of anything like a proper outlet, and the consequent destruction of the surface crop. Mr. Nesbit had adopted a corrugated line as the line of water level on clay soils. He (Mr.

Denton) thought that gentleman had disputed the existence of a water level altogether. That line, if it existed at all, was simply attributable to the superior power of capillary attraction; there was no line of positive wetness on drained land above the mean level of the drains. He believed that if test holes were made in drained land, and left open for a certain time, an atmospheric action took place on the sides of the holes, and an expansion of the soil, which prevented the water from passing through. They must not, therefore, take test holes as a criterion of drainage in all cases; although on any other lands than clay no doubt they were so.

Mr. Mechi: Mr. Parkes made his test-holes with pipes of clay around them.

Mr. Thomas (Lidlington) said that Mr. Nesbit had contrived to divest the subject of all empiricism, and shown, as far as it could be shown, that no particular system of drainage was suitable for all kinds of soils. It was much to be regretted that rival drainers, whether professional or amateur, could scarcely ever meet without declaring their own plans to be absolutely perfect, and all others to be essentially wrong (Hear, hear). Most of them had, no doubt, read that interesting work, "The Adventures of Gil Blas," in which Dr. Sangrado laid it down that bleeding and copious draughts of hot water were a certain specific and cure for every sort of disease; but Dr. Sangrado himself was not a greater impostor than the man who contended that one particular system of drainage, at one uniform depth, was applicable to all soils (Hear, hear, and laughter). The present discussion seemed to tend to two practical conclusions, both of great importance. One was, that no depth could compensate in the case of homogeneous clays for too great a distance between the drains (Hear, hear). The other, that in the case of friable and springy soils they could hardly go too deep (Hear, hear). In the case of springy soils at Lidlington, he (Mr. Thomas) had gone down to a depth of twelve and fourteen feet, but he did not maintain that depth was necessary in all cases. There was one point upon which, as a practical man, he differed from the lecturer. It was, that at all inclinations of the soil, the drains should be taken up the steepest acclivity. Up to a certain angle that was no doubt very good, but it was not of universal application. He himself occupied a good deal of land on wet and precipitate hills, and he was satisfied, by experiment, that the system would not answer there. With regard to the overdrainage of grass land, he had seen it done so often, on so many hundreds of acres, that he could not help expressing his entire concurrence in what had been said upon that subject by Mr. Nesbit. What they wanted was, that the land should be sufficiently dry for the cattle, and at the same time sufficiently moist for the production of grasses, and that object was not always kept clearly in view. On the whole, he thought they might safely arrive at the conclusion that it was impossible to lay down any known rule in drainage as of general application to all soils (Hear, hear).

Mr. Bullock Webster said it was only a few years ago that he stated, as his opinion, that certain grass lands might be over-drained; and when he did so, the *Quarterly Review* declared that such a remark could only have emanated from a hermit, brooding over his own ignorance, in a garret in London (laughter)—that it was only such a man who could entertain the idea that grass lands could be over-drained; now the discussion to-night showed this idea was not entertained by himself only. There can be no doubt as to the importance of deep drainage for springs; and in porous subsoils, deep drains at wide intervals are more economical and beneficial; but that in the retentive clay subsoils, not surcharged with underwater, he had always taken a decided part in opposition to draining below thirty-six to forty inches; as these soils require drainage for surface water, and the object was to get rid of that quickly. But he had hardly expected his friend Mr. Mechi to admit in so straightforward a manner that his shallow drains had answered best. He believed that the practice of going deep in strong clay subsoils was only a waste of money; and his friend Mr. Denton, who had advocated that system for many years, now allowed that they could not put their drains further apart in consequence of the increased depth.

Mr. Denton: I never said that. I have always been of opinion that depth does not compensate for distance.

Mr. Webster: Then to make the drains an extra foot deep could not effect the slightest good. It was only to incur extra expense, without any corresponding advantage. After the many years' experience they had had, he was sure there must be at least five hundred practical farmers in England who were able to state whether or not a depth of four or of three feet was best in the case of strong clay soils. (A voice: More; there are five thousand). He held, then, that they ought to come to a practical conclusion as to what was right in the case of these soils. Every day's observation and experience increased his conviction that his own views were correct, and that evening's discussion had afforded a most gratifying confirmation of their accuracy.

Mr. Mechi asked how far apart Mr. Webster placed his drains?

Mr. Webster: The closer the better. I should like them to be eighteen feet.

Mr. Hatfield, (of Euston, Stamford,) said that having had some experience of draining upon retentive clay soils, he should like to make one or two observations upon the subject of that evening's discussion. Before commencing the drains he dug a few trial holes of about five feet in depth; he covered them carefully, and watched when the rains fell for the purpose of ascertaining at what depth the waters entered, as a guide how he ought to drain his land. Now he found that whenever there was a continuous heavy fall of rain it would enter the pits at one foot, but in a moderate fall of rain it would enter the pits at a depth of two feet. He concluded, therefore, that it was necessary to go sufficiently deep below the two feet, in order to arrive at a method that would be applicable to all the circumstances of the soil. Adopting that system as a standard for his drains, he went down thirty inches, and afterwards increased the depth to thirty-six inches; and for ten years he had found that thirty-six inches would drain the land most effectually.

Mr. B. Webster: In what county do you farm?

Mr. Hatfield: Northampton; and the drains answered admirably. But there was another point which entered into the question of drainage, and that was the cost. He had therefore made one description of drain in this manner:—He cut a drain three feet deep, and nine inches in width at the top and gradually tapering away to an inch-and-a-half at the bottom. This he performed with tools made for the purpose. The first spit was thrown on one side, the second on the opposite side, and the third on the same side as the first. The second was then returned to fit the drain in the same manner as the key-stone of an arch. In order to avoid the expense of tiles, he put some thorns at the bottom, not for the purpose of supporting the drain, but simply to intercept an escape of mould. By this simple means he secured a most effective drainage. The drains had now been in existence for eight years, and were still in the most perfect condition. He mentioned these facts because he considered that they had an important bearing upon the question of expense, and showed that there were cases in strong retentive clays in which land might be effectually drained without resorting to the use of tiles.

Mr. Mechi: Is yours brick-earth or tile-earth?

Mr. Hatfield: Brick-earth.

Mr. Coussmaker, (of Westwood, Guildford,) was glad to find that there was one point at all events upon which they were agreed, namely, that no one system was generally applicable to all soils alike. He knew nothing about springy, and little about porous soils; but upon strong clay soils his idea was, that the best system was that which got rid of the water in the quickest manner. A moderate depth, therefore, at as frequent intervals as convenient, was what he considered best. He had no objection to increase the depth—they would drain the soil perhaps equally well—supposing the expense of the operation was not an object, but it was money thrown away to increase the depth beyond a certain distance, or to suppose that by so doing they could place the drains further apart. His practice had been to go about seven yards apart and about thirty inches deep; he was glad to find Mr. Mechi agreeing with him. With regard to laying the land flat where the soil was composed of clay, it was not desirable. He had seen the system fail, and would on no account adopt it himself; as the cultivation of the land could not in that case be performed without considerable treading of the horses, which ought most carefully to be avoided; but by laying ground in 7½ feet lands the horses could be confined entirely to the furrows, also the land dried faster.

Mr. W. Bennett (Cambridge), after some experience in draining various descriptions of land, had arrived at conclusions similar to those of Mr. Nesbit. He was also pleased with the observations of Mr. Mechi, on account of the frankness with which they were spoken, and readily acknowledged the services which that gentleman had rendered to the cause of agriculture by his experiments in farming, and by directing attention to masters which were of interest and importance to the agricultural community (Hear, hear). He thought, however, that his friend was certainly wrong in putting gravel at the bottom of his drains and tiles at the top (laughter). Upon the whole, he (Mr. Bennett) was of opinion that they were likely to come to a safe conclusion to-night; and that was, that upon strong clays it was useless to go tremendous depths, involving an expenditure that could never be repaid the farmer; and that drains varying from five to seven yards apart, with a moderate depth, so as secure them from damage, say from two-and-a-half to three feet, were most desirable upon retentive soils. He had farmed some of the strongest land in England for a considerable portion of his life, and these observations were the result of his experience. For his own part, he thought the club was much indebted to the professional drainers who had expressed their opinions to-night. Although he could not go the "whole hog" with Mr. Denton, yet the views of that gentleman well deserved consideration; and he could not doubt that the discussion would prove of great service to the agricultural classes generally.

Mr. Trethewy (of Silsoe, Beds) said the subject had taken exactly the turn that he expected it would take. Although Mr. Nesbit gave notice that he would treat on the mechanical and chemical principles connected with the soil, the discussion very quietly diverged into practice—a result which might have been anticipated in the case of a meeting of practical agriculturists. One great point which had occupied their attention was the depth of drains. He did not himself advocate either deep draining or shallow draining as a system, but from what he had heard that evening, he supposed he might infer that the shallow drainers were those who went three feet deep and less, and the deep drainers those who went further below the surface. Now, his idea of draining was not only to get rid of the water, but also to act upon the surface and the substance of the soil as much as possible. (Hear, hear.) In draining for corn lands and for grass lands there were different objects to be kept in view. In the case of grass lands they wanted to keep up a continuous verdure; but that was not the case as regarded arable lands, and he maintained that the latter required to be more drained than the former. It was well known that the roots of wheat would descend to a very great depth. He had never witnessed it himself, but he had been told on good authority that the roots could sometimes be traced four feet below the surface. (A voice: "More than that.") If the roots of the soil did really descend so low, it should be made a great object in drainage to prepare the soil for the sustenance of the wheat plant. He did not fully subscribe to the doctrine that depth did not at all depend on distance. He held that it did depend on distance to a certain extent; conceiving that if they went twelve yards apart they must generally drain deeper than if they went only four yards apart. Some remarks had been made about Elkington's system; such things looked very pretty in theory, but he must declare that in his experience he had never been able to hit upon the right mark. He remembered one instance in particular in which he could not do that. There was a bog at the bottom of a sandhill. On one side of the road was a wild sandhill: immediately below it was a bog. He thought that if he cut a very deep drain at the junction of the sandhill and the bog, he should thereby cure the bog; but he did not. He was obliged to go through the bog, in the direction of the hill, and then he did cure it. He did not know whether or not the geological strata in his district were similar to the strata of districts in which Elkington's system was said to have answered; but this he did not know, that he had tried that system three or four times, and was determined that he would never try it again. (Hear, hear.) Swallow-holes had been referred to. He held that in many instances it was impossible to do without them. No one could suppose that swallow-holes were applicable to clay lands; but there were certain descriptions of soil—for example, there was a case near the Tetbury road, in the vicinity of Cirencester—where by adopting that mode of proceeding you get rid of an immense quantity of water at a very small expense; whereas the obtaining an outfall in the usual manner would involve a large expenditure.

Mr. Wood (of Ockley, Sussex) said he had the misfortune to farm that description of soil which Mr. Nesbit regarded as a *bona fide* clay, and he had expended a good deal of money in draining land which required quite 50 per cent. of sand to bring it into a fit state to make a brick. What Mr. Nesbit had pointed out with respect to hilly land corresponded with his own experience. If in putting a drain across the slope you were to place it under a stratum of clay, you would catch none of the water; whereas if you were to place it above, you would catch all. The great difficulty was to find the exact position; and, therefore, by going down the slope and cutting across, or through the strata, you generally would let off the water in the most effectual manner. The discussion had turned naturally more upon the practice than upon the mechanical and chemical principles of draining. As regarded distance, he certainly thought that in the description of soil of which he had spoken, the deeper drains would carry wider than shallow ones. He had found that in cases which, owing to a hollow perhaps in the ground, he had not been able to go so deep as in other places, the ground had not been made so dry. He had drained at distances of one rod apart, and that was as close as he felt justified in going, with the prospect of wheat at 40s. per qr.

A Member: What is your depth?

Mr. Wood continued: When he commenced eight or ten years ago, a depth of two feet was advocated by one party, and a depth of four feet by another. Being of a prudent turn of mind, he thought he would adopt the middle course, and accordingly he adopted three feet (laughter). In cases in which he had to cross a flat, he had been prevented from going more than two feet or even eighteen inches deep to preserve a fall, and in such cases he had always doubled the number of drains.

Mr. Mechi: You have not drained four feet.

Mr. Wood said he had done a little, but it was on grass lands. He had learned from Mr. Nesbit and others, that there are some beneficial results to be secured through the passage of rain through the soil, and he was very much opposed to carrying it away by means of surface furrows. Besides, having had doubts about the best depths for his drains, he had entertained doubts about the proper distances between them. He did not find his land too well drained with the drains at a rod apart, that is 16½ feet. He found the soil wettest farthest from the drains, and he also found that the wheat above the drains and nearest to them looked the best. If his drains were placed eighth feet apart the change would, he believed, be very beneficial to him. As regarded depth, if he could go four feet at the same expense as three feet he should prefer that depth.

Mr. W. Shaw (of Coton, Northampton) said, viewing the question as a money question, he had no hesitation in saying that three drains at four feet were more beneficial then four drains at three feet. He wished to state that emphatically, as his decided opinion in regard to depth.

Mr. John Parkinson (of Knapthorpe, Notts) said he had found, from experience with regard to drainage, that practice was far more valuable than theory. He did not refer now to his own practice; what he alluded to was draining done thirty years ago by his predecessor. That drainage was under two feet six inches deep. It was done at the time when tiles were first introduced into Nottinghamshire. The person who put them on was very much laughed at, at the time, for burying his money; but he persevered, and his neighbours first became convinced that he was right in the year 1829, when he and his brother were the only persons in the district who had not a rotten sheep. The land was a strong red clay; the drains were put in under the old furrows, tenacious as they were, about eighteen or twenty inches deep, and the lands having been gradually levelled from the high ridges, the depth of the drains was now about two feet six inches. That land was as well drained as any land could be, even though it were drained four feet deep. To illustrate this he might refer to an article, with which they were no doubt all familiar, which had appeared in the pages of the Royal Agricultural Society's Journal, and which was written by Mr. Milward. That gentleman stated that he had drained a twelve-acre field, two feet, two and a-half feet, and four feet. The outfalls of all the drains were visible, so that anyone could at once see in which the rains which had fallen ran first; and having been there frequently himself, he could never perceive very much difference in point of speed between the different drains. No doubt some difference would be discovered on a careful examination, but he had not perceived any. The effect of the drainage as a whole was such that no one could tell where the shallow drainage was, and where the deep drainage was—the soil was equally productive; and he concluded therefore, in this case, that, as shallow drainage involved the least expense, it was preferable to deep drainage.

A **Member**: You have been speaking of grass lands only.

Mr. **Parkinson** continued: The land to which he had been alluding was all ploughed land. He could tell Mr. Denton of an instance in which Elkington's system of draining had been put in operation within the last few years. There was a large tract of boggy land, the outbreak of Sherwood Forest springs, which was attempted to be drained for a number of years, in a great variety of ways, the attempts all failing, because those who made them could not get beneath the water. Mr. Mildward happened to get hold of some land in the vicinity which commanded this, though it did not appear at first to be connected with it; and when a drain had been opened there, the water rushed out with great force, the result being that the land in question was completely drained, on the Elkington system.

Mons. **Trehonnais** thought the practical conclusion to be arrived at, as the result of that evening's discussion, was—that no one principle or system of drainage should be dogmatically proclaimed as applicable to all descriptions of lands (Hear, hear). The value of the discussion arose chiefly from the fact that those who took part in it represented different parts of England, with all their differences of geological formation and soil; while he himself appeared there to represent France in this matter. It could not fail to be advantageous to elicit the opinions of practical men with regard to the drainage of the land with which they had to deal. Mr. Wood had found that, in the case of high lands, the best course was to lay the drain up-hill. His own practice was the reverse of this. On his farm in France, he was engaged in extensive draining operations on such land last winter. He was obliged to lay his drains perpendicularly to the dip of the land, having been taught by observation and experience that the other practice would not prove satisfactory. Having devoted attention for some years to what he might term scientific drainage, he contended that the aid of science was by no means to be despised. Scientific principles like those laid down by Mr. Nesbit were, in his opinion, very useful guides in the practical operations of drainage. In this matter, as in many others, what was especially needed was, a combination of science with practice; and this would, he believed, prevent a vast amount of useless expenditure, and labour in vain.

Mr. **Thomas** (of Bletsoe) said: I would not trouble you at this late hour after so much has been said on the subject had not my own experience (which has extended over a period exceeding twenty-five years) led me to a different conclusion from that of several of the previous speakers, in regard to draining *stiff clays*. I am of opinion that three feet is a depth sufficient in such lands; a less depth would be liable to injury from cart-wheels and other casualties. Drains four feet deep would not be so effective in such soils placed at a greater distance apart; and the advantages arising from drains of such a depth would not compensate for the extra expense or cost. However, on soils of a different character—for instance, mixed soils, it would be desirable to go four feet, or even more; having myself drained such soils to the extent of five, and in a few instances as much as six feet. It is, therefore, difficult to lay down any system as a general rule; and I am glad to find that my practical experience has been confirmed by much that has been advanced by Mr. Nisbet on the subject.

Mr. C. M. **Bidwell** (Ely) said, having been present at many discussions on the subject of drainage, he was very glad, as a practical man, to see that the question of deep drainage *versus* shallow drainage was being reduced to a very narrow compass, namely, between three feet and three feet four inches, and four feet. He thought they were nearly all progressing more and more towards four feet. He had seen a great deal of draining done at that depth, and he did not know a single instance connected with strong clay lands in which experience was not in favour of a depth of four feet. He had been over a farm in Sussex that day, in the neighbourhood of Mr. Wood's farm; and in that case the drainage was carried to the depth which he had mentioned. and the result was highly satisfactory. He hoped that in a few years they would all adopt a minimum depth of four feet.

Mons. **Trehonnais** hoped he should be allowed to supply an omission in the remarks which had fallen from him. He had intended to allude to the loss which the agriculturists both of England and France had sustained in the lamented death of the late Mr. Trimmer. (Hear, hear.) During a great part of his life that gentleman bestowed more attention on the subject of drainage than almost any one in that room; and he thought he rightly interpreted the feelings of all the members of that club when he said that they regretted the loss sustained by geology and agriculture in the death of that distinguished man. (Hear, hear.)

Mr. C. **Stokes** (Kingston, Kegworth) had seen a good deal of draining, and of the effects produced by draining in the counties of Nottingham, Leicester, and Derby, and he must testify that in the last five-and-twenty years there had been a very great improvement there in that respect. When they first began to drain in that part of the country, thirty or forty years ago, they put tiles in the ground from 12 to 18 inches deep, and in a very few years this proved to be of no use. Mr. Parkes' system was then introduced; about six or seven hundred acres were drained on this system, and he had not seen a single case of failure. It was strong land, but not entirely clay, there being a good deal of marl. He did not know a single failure at a depth of four feet. When that system was first adopted, there was hardly a person in the neighbourhood who did not laugh at it; now no one scarcely drained at a depth less than four feet. He was satisfied that it was a great mistake to suppose that water would not percolate through the soil at that depth. Let the air get into the land, by making the drains, and that would make a way for the water. He did not wish to find fault with what had fallen from gentlemen who came from other parts of the kingdom; but as regarded that part of the country in which he lived, he was convinced that no practice answered so well as that which he had mentioned. (Hear, hear.) One word with regard to what had been said by Mr. Thomas about the over draining of grass lands. He fully admitted that for a year or two grass lands might appear to have been over-drained, the water having been taken away which previously tended to produce a coarse kind of grasses. The remedy for this, however, was to put some manure on the land; and when that had been done judiciously, the advantage of draining would soon be visible in the production of grasses of a better description. (Hear, hear.) A friend of his, who drained some grass lands soon afterwards, remarked to him that it was injured. The next year he (Mr. Stokes) asked him if he still considered it injured by draining. "Oh, no," was the reply; "I never saw finer grass land in my life." (Hear, hear.) If the draining of grass land were followed by a proper application of manure, the land would soon come round again. In conclusion, he would observe that they had not heard any gentleman say that evening, that having put his drain pipes four feet deep, he had been compelled to pull them out again. On the other hand, he had himself drained at a depth of two feet and a-half, and the result was most unsatisfactory.

Mr. B. **Denton** could not help expressing his concurrence in the remarks of Mons. Trehonnais, respecting the death of Mr. Trimmer. He had been frequently opposed to Mr. Trimmer in his views relating to drainage, but there was no man for whose exertions and character he entertained a greater respect.

Mr. G. H. **Ramsay** (Newcastle-on-Tyne) must express his dissent from the notion which appeared to exist in the minds of some practical, farmers that there was something like opposition between practice and theory. He might point to the most practical man in that room, and predicate of him, that before he became a practical man, as regarded drainage, he was to some extent a theorist (Hear, hear). He thought it was high time to do away with the foolish distinction which was often drawn between theory and practice. What they had to aim at, in seeking perfection in drainage, was the proper combination of practice and theory (Hear, hear). They did not ask Mr. Nesbit how they were to use a spade or to dig their drains; they looked to him for the enunciation of scientific principles, and all they had to do was to consider the general rules which he had laid down; he was not so foolish as to expect them implicitly to follow them under all circumstances (Hear, hear). If they began at practice without theory, they would all find, ultimately, that they had begun at the wrong end. There was one view of this question which he had not heard that evening. The matter had been discussed as if the farmers drained all the land of the country; whereas, in fact, a great deal of draining was done by the owners of land. If, indeed, a farmer had plenty of capital, there was no reason why he should not avail himself of it, under proper conditions, to effect the drainage of his land; but they all knew very well that, as regarded the country generally, landlords were called upon to aid with their money in drainage operations as well as in providing proper buildings on the farms (Hear, hear). This was not, therefore, solely a farmer's question; but he believed that landlords in general were open to conviction, and that if the work of drainage were slow, it would also be sure. He congratulated the club on the intelligence which had been displayed that evening in regard to drainage, and considered the tone of the discussion an indication that the club would continue to be—what it deserved to be—the leading agricultural club of the kingdom (Hear, hear). There was one point on which he wished to correct what appeared to him a misapprehension. One or two gentlemen had talked of the subsoil as if there were everywhere a sheet of lead just below the surface, which it was very difficult to break through. He did not know how far the observation of others agreed with his own; but he must say he never saw, in his life, a field with a uniform subsoil (Hear, hear). He never saw a field where the subsoil did not vary in depth and quality. As regarded the different systems of drainage, he would not pretend to say which system was best. He did not think the shallow system was the best, and he did not know that the deep one was the best (laughter); but in regard to that point he would simply observe that anyone who was acquainted with the science of geology would unite with him in declaring that a subsoil was not the uniform sort of thing that some appeared to imagine.

Mr. MARSHALL (of Riseholme) said, so far as his own experience enabled him to speak, he thought the ordinary drainage of land, where no great geological difficulties presented themselves, a very plain, common-sense course of proceeding. To lay the drains down the line of greatest descent; to put them in at a minimum depth of four feet, at a distance, varying according to the nature of the subsoil, of seven to ten yards apart, would in all the cases he had met with be found equal to any emergency. He had reason to feel greatly obliged to Mr. Bailey Denton for his assistance and advice in most of the draining he had carried out; and in confirmation of his (Mr. Marshall's) belief in deep drainage, he had within the last two years taken up and otherwise obliterated the entire drains upon two hundred acres of land which he had lately become possessed of, which had been put in up the furrows at a maximum depth of two feet six inches, at a distance of five yards apart, but which had proved utterly worthless as a means of drainage. He had since re-drained the whole at a minimum depth of four feet, nine yards apart, down the direct fall, across ridge and furrow, and without reference to high-backed lands or other irregularities of any kind; and he had good reason to be perfectly satisfied with what he had done. And he felt no hesitation in recommending the same system to others, where a like description of soil presents itself. By a moderately strong jointy clay, intermixed with very small sand-beds and an occasional thin stratum of stone, varying in depth from one to three feet, and with no water to contend with but surface water, this land —from having been a wet, ungenial clay, requiring three and four horses to plough it—is now a dry strong loam, most satisfactorily ploughed by two horses, and producing as fine crops of turnips as can be seen anywhere, and without any difficulty whatever in ordinary seasons as to eating them upon the land. He would add that he had known others in his own immediate neighbourhood who had taken up miles of shallow drains, and replaced them by deep ones; but he never yet heard of any one who had ever taken up a deep drain and replaced it by a shallow one. His draining cost 65s. per acre, besides the pipes—say about 18,000, 1¾ inch, at 18s. per thousand.

The CHAIRMAN said, after the very long discussion which had taken place, he would not trouble them with many observations. He must, however, make one remark in confirmation of the opinion expressed by Mr. Stokes, with respect to the apparent injury sustained by grass-lands from draining He quite agreed with that gentleman that the injury was more apparent than real (Hear, hear). Of course, when grass-lands had been drained, a certain amount of coarse herbage would disappear, in consequence of the removal of the water. But they must wait patiently till better and more nourishing grasses took their place. That that operation would be assisted by a good coat of dung there could be no question (Hear, hear), but that Nature herself would perform the work, if they only had patience, was equally clear. He had seen this result in the cases of grass-lands which had been drained by himself and others. With respect to the depth of drains, he thought there could be no positive and invariable rule; but every person should, before he began to drain, try to find out where the water was, and then make his drain of the requisite depth (Hear, hear). His own opinion, however, was decidedly in favour of deep drains; and he believed that where errors had been committed they had been more on the side of shallow drains than of deep ones (Hear, hear). He would now call upon Mr. Nesbit to reply.

Mr. NESBIT said he had very little to say in reply to the observations which had fallen from the various speakers. He must confess that he had expected to meet with much more opposition than he had done; though all he contemplated doing, in his opening address, was to state a few scientific facts and principles relative to the nature of the soil. He anticipated that he would be overwhelmed by the shallow-drainers, but the principal attack had come from the deep-drainers. He took neither one side of the question nor the other; but he must say that he could hardly conceive any person, who considered how great was the variety of soils to be drained, maintaining that any one uniform depth would answer best universally. If there were any such person, he was certainly much stronger in self-will than he (Mr. Nesbit) was. Mr. Baker made a remark with respect to the nature of the experiments presented, which indicated that he scarcely understood their object. In the different specimens of soil which he had exhibited, his design was to represent, in a few seconds, what would probably take place on their farms in several days. He was very much astonished that Mr. Bailey Denton appeared never to have heard that a shallow drain would sometimes run before a deep one. He had a work of Mr. Denton's in his hand, which he had carefully studied, and which contained a reference to Lord Wharncliffe's system of drainage. It was stated that Lord Wharncliffe having drained four feet deep, and this not having been found to answer, he then put shallow between deep drains, and that did answer. Again, the following is an extract from a letter of Lord Fortescue to his son in reference to the same point:—"I may here mention that the people on our two farms say that they constantly find the two-feet drains dry after continuous dry weather; but that after heavy rains they seem to discharge much more water, in proportion to their length, than the four-feet drains, which seem to be comparatively little influenced by change of weather." All this was taken from Mr. Denton's own book, and he might cite other passages to the same effect. The only other observations which he wished to make had reference to the amount of rainfall. That must, of course, have a distinct influence on the depth and distances of drains.

Mr. Nesbit then exhibited a rain-gauge of very simple character, and explained to the meeting the manner in which it might be used, adding that the cost of such a useful instrument was only 12s. 6d. They could be obtained from Mr. Casella, of Hatton Garden.

On the motion of the Rev. Mr. James, seconded by Mr. Thomas, of Bletsoe, the following resolution was unanimously adopted—

"That in draining land, no depths of the drains can compensate for too great width of the intervals—that porous soils should be drained at depths and intervals suitable to their respective characters—but that retentive clays require drains at more moderate depths and distances."

Mr. NESBIT moved a vote of thanks to the chairman, observing that they had never had a better chairman since the club was established (cheers).

The motion was seconded by Mr. Ramsay, and carried by acclamation.

On the motion of Mr. Payne, seconded by Mr. Bullock Webster, a vote of thanks was given to Mr. Nesbit for his able introductory lecture; and with this terminated the proceedings of the evening.

THE TRADE IN THE HORNS OF ANIMALS.

The trade in animal products of a miscellaneous character is a much larger one than is generally supposed. There are several of the minor products dealt in, which offer an interesting field for inquiry, and for collecting the scattered data which can alone serve to furnish an approximate idea of the aggregate value and importance of the trade considered in a mercantile and a manufacturing point of view.

The horns of animals, for instance, wild and domestic, may seem of a very secondary importance, and yet the trade in them, home and foreign, rises to a very respectable position in the statistical returns. Indeed, the rights and privileges of the hornworkers and horn-pressers have in various reigns occupied the prominent attention of the Legislature. But there is no fear in the present day "of the trade being ruined, and the business lost to the nation," as was the cry when the statutes 6 Edward IV. c. 8, and 7 James I. c. 14 were passed, forbidding the sale of horns to foreigners, and prohibiting the export of unwrought horns. We not only use up our own large home supply of horns, but import on the average fully as many more, namely, about 3,500 tons per annum.

While many of the former uses of horn for glazing purposes, for drinking-cups, for hornbooks, and for the sounding instruments of the bold forester, have passed away, other and more elegant and varied applications have been found for this plastic material, insomuch that the trade Directories show us half-a-dozen or more workers in horn, forming separate and distinct classes of the trade.

Large as the present use of horns and hoofs is, we believe that many further manufacturing purposes may be found for them, and that they will become even still more important than they now are in a commercial point of view.

Although the largest trade application of horn is for knife-handles, combs, and umbrella tops, still the other uses are also extensive, and as numerous as the varieties of horn which come into the market, or bristle on the head of the animals characterized by this frontal appendage. Ox, buffalo, and deer horns are those mostly worked up; but the horn of the rhinoceros, ram, and some few other animals, are also employed to a limited extent. For the spiral tube of the antelope, little or no commercial use seems yet to have been found.

The study of the composition, formation, and growth of horn is an interesting one, and well deserving of careful investigation, in view of the manufacturing purposes to which this substance may be applied. In common parlance, any hard body projecting from the head, terminating in a free, unopposed point, and serviceable as a weapon, is called a "horn." But the composition of these differ materially. Professor Owen well observes, "Even the weapons to which the term 'horn' is properly or technically applied consist of very different substances, and belong to two organic systems, as distinct from each other as both are from the teeth. Thus the horns of deer consist of bone, and are processes of the frontal bone; those of the giraffe are independent bones or 'epiphyses,' covered by hairy skin; those of oxen, sheep, and antelopes are 'apophyses' of the frontal bone, covered by the corium, and by a sheath of true horny material; those of the prong-horned antelope consist at their basis of bony processes, covered by hairy skin, and are covered by horny sheaths in the rest of their extent. They thus combine the character of those of the giraffe and ordinary antelope, together with the expanded and branched form of the antlers of deer. Only the horns of the rhinoceros are composed wholly of horny matter, and this is disposed in longitudinal fibres; so that the horn seems rather to consist of coarse bristles compactly matted together in the form of a more or less elongated sub-compressed cone."

The horn of the rhinoceros, like its skin, when polished and in thin layers, is as transparent and mottled as tortoiseshell. These horns are often obtained 2 feet long, and 10 inches in diameter. In India they have the reputation among the Mohammedans of being an antidote to poison; and in older times they were the fashionable scent and oil-bottles of the Roman dames.

It is commonly believed that the horns of the ox acquire an additional ring every year after the third, but the addition of annuli is far from being annual in other species. Many rings are gained in one year's growth of the ram's horns, and in those of the ring-horned antelope. The length of the horn forms a distinguishing characteristic in some breeds of cattle; but whatever improvements may have been effected in the form and character of the carcase, by the modification of food and habits, it does not appear that we have been able to superinduce any improvement or alteration in the size or texture of the horns. Indeed, the horns of the wild animals would seem to be more prominent than in the domesticated races.

The immense horns of the African or Cape buffalo, of the Java buffalo, and the Arnee buffalo of India, are the most valuable, and the extent of the trade in this class of horns may be estimated from the fact that about one million buffalo horns were shipped from the port of Madras last year. As we derive two-thirds of our foreign supply of horns from the East Indies, it is not improbable that the existing disturbances may cause a deficiency in the shipments thence, owing to the interruption of internal communication, and the withdrawal of large masses of the population from their ordinary peaceful occupation of collecting and bringing in the horns to the mercantile houses.

South America (chiefly Brazil and the Argentine Republic) furnishes us with a considerable quantity of ox horns, and we also receive several hundred tons a year from the United States. For buffalo and stag horns we are mainly dependent on India: of the former we import fully 1,400 tons per annum. Averaging these at 1,400 horns to the ton, this would show a mortality of a million buffaloes a year, besides what may be locally used up, or sent to America and the European ports. Of deer horns the Sheffield cutlers and others work up about 400 tons, chiefly derived from Ceylon and the peninsula of India. The "fall" from at least 300,000 head of deer is required to supply this quantity.

Of the aggregate annual quantity of horns entering the market, estimated at 6,400 tons, about one-fifth is manufactured into combs, valued at from £300,000 to £400,000; a large quantity is worked up into knife and cutlass handles; while there are many other miscellaneous uses, in shoe horns, scoops, drinking horns, &c. The waste pieces of stag horn are boiled for size in the cloth-making districts; and the pith or slough of other horns and hoofs is crushed for tillage, when light and thus fit. The heavier portion is converted into prussiate of potash and Prussian blue, of which about 10 tons are made weekly in Sheffield from the waste products.

The hoofs of cattle, being composed of the same material as horn, are used for manufacturing purposes to a small extent; and besides our home supply, we import about £4,000 to £5,000 in value. They are pressed out into combs and horn buttons; but the greater part finds its way to the boilers of the glue maker, and to the manufactory of the chemist, who work them up, with other animal refuse, into prussiates."

As a fertilizer, horn cuttings and shavings are very useful when they can be obtained in any quantity.

The composition of stag horn most resembles bone, while the horns of black contain fully 90 per cent. of albuminous matter. It is difficult to estimate what quantity of the horns used up in manufactures, or of the slaughtered animals, are returned to the soil in the shape of manure, in common with the numerous other animal and vegetable products. Mr. Braithwaite Poole, in his Statistics of British Commerce, calculates that the animal manures used yearly amount to about ninety million tons, besides fat, blood, garbage, &c.

MODES OF ENTERING AND QUITTING FARMS, WITH SUGGESTIONS FOR THEIR IMPROVEMENT.

[A PAPER READ BY MR. ROBERT BAKER, OF WRITTLE, TO THE MEMBERS OF THE FARINGDON BOOK SOCIETY, ON TUESDAY, DECEMBER 1ST, LORD BARRINGTON IN THE CHAIR; LORD RADNOR AND ABOUT A HUNDRED OTHER GENTLEMEN BEING PRESENT.]

The growing importance of agriculture, and the rapid strides it has of late made, demand our utmost consideration; for when we consider that with a limited area we have a largely increasing population augmenting yearly, it becomes a subject of the greatest national importance to ascertain to what extent the ordinary modes in operation for the production of bread-corn and meat are beneficial, and more especially whether the present system of tenure is the best calculated to attain that desirable object; for, as Adam Smith asserts what few will be disposed to attempt to disprove, that "Labour is wealth, "thus it requires no laboured argument to prove that the large amount paid annually for wheat might be saved to the country, at any rate to such an extent as we by increased exertions and application of means might be able to effect it; and as the enterprise and energy of the British farmer can be sufficiently estimated, it will be well next to inquire what other obstacles exist to retard it; and, upon a due consideration of the subject, to point out a remedy so far as it may appear requisite for the accomplishment of such purpose.

As it will be of too extensive a character, upon an occasion like the present, to attempt an investigation of the question in all its bearings, and as the discussion of this evening is appointed for that portion only which relates to the customs existing in different portions of the kingdom, upon the change of tenancy of farms, as well as upon what period of the year is most suitable, I shall at once discard any elaborate investigation of the customs now prevailing throughout this kingdom, but proceed at once to investigate the subject upon its broad principle, with a view rather to show which really ought to prevail, than to discuss the anomalous conditions that at present exist, the remains now of a period long passed away; and at the present time totally inadequate to the advanced requirements of the age.

If we endeavour to trace back to a very distant period, we shall find that the first tenants rendered payment of rent to the lords of the soil, for the most part, in labour or in kind. Most of the college leases, even to the present day, retain many of the conditions that existed centuries before our time; still receiving their rents in grain, malt, and money, or having the amount of rent upon the average prices of corn and malt for the year current to which they apply. In process of time rents became entirely paid in money; and corn leases for terms of years have become so modified, as to meet the fluctuations that arise in the value of produce. This system has been attended with the most beneficial results, as it has enabled landlords to demise their estates for terms of years, without a liability of becoming seriously injured in case the price of wheat and grain, from unforeseen circumstances, should rise to higher prices than had been contemplated. It enables a tenant also to take land upon like tenure, with a certainty of continuance as tenant under circumstances of depression in the prices of corn, inasmuch as his rent will fluctuate in amount proportionally with the prices he obtains; and thus his rent will at all times more truly represent the value of land, in relation to the value of produce, than by any fixed money payment that could be devised.

At a subsequent period it was found necessary to establish a principle to protect the landlord from being seriously injured by the ignorance or wilfulness of a bad tenant; and the ancient law, based upon antecedent customs, afterwards became modified as the advancing progress of the age required.

In our time, however, such has not been the case. The old law prevails to such an extent as to become injurious to an improving tenant, whilst it has not sufficiently restrained a bad one. Conditions in leases, therefore, have more or less been resorted to, as the only means of defining what custom had failed doing, and thereby fixing the mode of cultivation to be pursued, and determining the mode of entering upon and quitting of farms.

In the first instance the custom was to fix the mode of entering in such manner that the largest amount of payment might be exacted from the tenant by valuation, upon his entering upon the farm. This was done mainly for the purpose of insuring an amount of capital to be paid down, which, from the nature of the investment, could not be extracted by the tenant until at the immediate time of his quitting the occupation, thereby securing the rent to the landlord to the amount of claim that the tenant would have upon the farm at quitting. This system, however, carried its own result to the end of the term: it was, in fact, equivalent to depriving the tenant of the capital he embarked throughout his entire lease, and thus depriving him of any advantages, either by return of interest or by the application of the capital to the improvement of the soil.

It was obvious, however, then, as at the present time, that the farmer ought to be protected from waste, more especially by the tenant selling off the hay and straw without consuming it by horses or cattle, and without bringing on any equivalent in manure; and as the latter could not be formerly obtained to a sufficient extent to maintain the farm in good heart, a direct prohibition through the term to the selling any portion became the necessary and established custom of the kingdom, with partial exceptions only, where farms also were situated near large towns, when the tenants were allowed to sell wheat straw and hay, upon bringing back upon the farm an equivalent in purchased manure. This, by degrees, has become in many instances a pernicious custom upon estates. The tenants, from having paid the market value of the wheat straw and hay upon entering, also claim it upon quitting their respective farms. In other cases, and upon custom widely extended, the outgoing tenant is allowed the *bite*, or foddering, as it is termed, of the straw or hay, or is paid the value of such bite or foddering value by the incoming tenant, either at its money value, as estimated upon half the amount of marketable value, or by the outgoing tenant paying the expense of thrashing out the crop and carting the grain to a distance of ten miles, as the equivalent of such foddering value.

This mode appears a very rational one, and is, perhaps, the best hitherto propounded, as it enables the incoming tenant at once to take entire possession of the farm, and to turn the straw and hay to the best account, as well as enabling the outgoing tenant to proceed at once to his new occupation upon the same conditions.

The next consideration will be the manure, which, in all cases, ought to be left for the landlord, or his representative (the incoming tenant), by valuation, including also the expense incurred by the outgoing tenant in throwing it into heaps, or carting it out to its final destination for direct incorporation with the soil, or in heaps for subsequent application.

The next item usually paid for, and with due reason, is the amount of labour bestowed upon the land under tillage for the production of green cattle crops, or for the purpose only of cleaning and fallowing and draining the land. These heads premised, I shall at once proceed to show their various bearings, and to point out how far they become beneficial, as well as to discuss those points bearing immediately upon the question under notice for this evening's discussion.

In pursuing the subject, I consider it the best mode at once to assume that the estate is in hand, and unshackled by any previous fixed customs interfering with the system to be propounded in what I shall have in continuation to offer; and, therefore, discarding all other modes of entry and occupation, many of which are notorious for their defects, I shall, in discussing the subject, endeavour to simplify the mode of entering and quitting farms, thus keeping the principle I adverted to in the outset, of not charging the tenant with unnecessary payments, so far as can consistently be avoided without damaging the landlord, or preventing him resuming the occupation of his estate without difficulty or constraint.

My chief aim will be to show how far a system may be applied, so as to leave the capital of the tenant unfettered, but also to secure a continuous improvement of an estate, in place of those customs that secure it only up to a certain period of an occupation, and, afterwards, as it approaches its termination, allow it to become yearly withdrawn by the tenant—so much so, that, by the time of its closing, all the capital he had first invested in improving the farm becomes withdrawn, so that at the last it is frequently reduced to a worse position, as regards its state of cultivation, than it was found in at the time of entry upon the occupation. To obtain a desirable result of the nature I have propounded, I confess many obstacles present themselves; the customs that have prevailed upon estates being difficult to supersede, although those customs, for the most part, do not secure any object either desirable or beneficial, but, having for many years been practised, have become as it were rent-charges upon the estate to which they apply, payable every time a farm is transferred from tenant to tenant in perpetuity, and almost as difficult to be got rid of as even the tithe rent-charge itself, or parochial charges of any other description, unless by way of purchase at their estimated values. Whenever such payments extend to many subjects, so as to swell the amount of valuation beyond an ordinary and necessary amount, they become a severe tax upon the incoming tenant; and when they appertain to the value of the manure, through two or three years, in the shape of dressings, half-dressings, &c., as well as to rent, rates, tithe rent-charge, or parish and national rates, they uselessly swell the amount of the valuations, to the great injury of the tenants, who thereby become deprived of the benefit of the capital so invested throughout the whole period of their term or yearly occupation, as well as inflicting upon the landlord a very heavy charge in perpetuity upon his estate, and occasioning him great inconvenience whenever his farms again may chance to fall into his hands.

To obviate these evils on the one hand, and to secure the continuance of good farming to the end of the lease on the other, will occupy my attention in the task I have now undertaken; I therefore must crave your indulgence, and, although I may only partially succeed, I shall probably advance suggestions that more able and talented individuals will hereafter turn to better account, and which at some future period may obtain that degree of perfection which at my advanced period of life I can hardly expect myself to attain.

I will now proceed to investigate the period best adapted for the change of tenancy upon farms, the usual periods being New Michaelmas and Lady-day; and wherever the occupation consists principally of arable land, no doubt can exist that Michaelmas is the time most beneficial to both incoming and outgoing tenant, as it is the climax of the year's proceedings on the one hand and their commencement on the other, and with certain modifications may be made fully to embrace every object desirable for an outgoing and an incoming tenant to attain. In some districts, however, the harvest cannot be concluded by that period. In such cases the occupation must partly be retained and partly given up, still considering the quarterly day of New Michaelmas as the one best suited for the commencement of the year's tenancy, as well as for carrying on the necessary work upon the farm. I would premise, however, that the incoming tenant should have possession of those portions of the farm from which the grain crops have been cleared at an earlier day, and as soon as he may require them after they have been so cleared, and which should be allowed from one week after such clearing.

We will at once suppose that the landlord, being desirous to assist the incoming tenant, commences by allowing him, without prejudice, to take possession of such portions of the farm, for the purpose of fallowing, putting-in vetches or rye, or preparing for root crops, immediately after the fields have been cleared, due time being allowed for feeding them with sheep and swine—say fourteen days at furthest—from the time of clearing. He should also allow him to plough and till the fallowed land, if the tenant is desirous of doing so, and he declines himself further to do so at the time required; in fact, a virtual possession should be allowed upon portions of the farm previous to Michaelmas day, after the preceding crops have been removed.

At or previous to Michaelma-sday the valuation should be made, and which valuation should include all acts of husbandry executed by the outgoing tenant, of which he may not have derived any benefit, and from which he may only have derived a benefit in part.

In the first place, the necessary ploughings and tillages given to land since the preceding Michaelmas, when a green crop has not been taken. This portion of the valuation will include the ploughings and tillings of all lands considered as fallows, or producing green crops, as tares, rye, and such crops as are consumed by cattle during the preceding summer, and of all land prepared for the growth of roots, as mangel wurzel, Swede and common turnips, rape, cabbages, and crops of a like description. The course of cultivation of these crops, in addition to the ploughings and tillings as before stated, must be estimated and paid for at a such a sum as they may be valued at, without reference to the value of the crops, unless any defective management has produced such a result, and which must be determined by the valuers appointed.

In the next place, the manure ought to be valued at what it may be worth, taking the expenditure for oil-cake and corn in the preceding year into consideration, a fair proportion of such corn or oil-cake to be allowed over and above the ordinary value of the dung, to the extent of one-fifth of the entire cost only, upon proper vouchers being produced of its having been consumed upon the farm from the preceding Michaelmas, and to insure good cultivation to the last an allowance upon the oil-cake consumed the preceding year to the extent of twenty per cent., in my opinion, oxght to be allowed.

We have not treated of manure produced by extraordinary means, and it remains only to show that the ordinary manure produced upon the farm, and not applied to the production of grain crops, should or should not be paid for, together with the labour of carrying out and preparing, as well as carting and spreading upon the land, be paid for according to its value, which must depend upon the number of cattle and horses kept upon it, and the description of food upon which they have been fed; in no instance, however, should any manure be paid for unless made since the preceding Michaelmas, so in fact that the manure only of one year should in any case be valued, nor any portion be valued if a grain crop had been since taken from the land to which it had been applied.

We now come to an important item—the straw and hay of the previous year's crop. As regards the former, it ought to be considered as the property of the landlord, and not removable from the estate at the expiration of the term; the tenant having an interest therein by feeding it, and for which he ought to be compensated. Thus in many counties is it computed by the cost of thrashing and carting out the crop, the former being paid for by the incoming tenant, at such a sum per qr. as the valuers may agree upon, the incoming tenant carting out the grain a distance not exceeding ten miles in addition: in other cases the wheat straw being estimated at per ton, at its market value at the barn, half that price is paid; barley being taken at two-thirds; and oats, if well harvested, at three-fourths of the value; beans and peas at half that amount. Supposing, therefore, that the wheat straw is worth 24s. per ton, 12s. would be paid as the feeding value; barley at two-thirds, or 8s.; oats at 9s.; and beans and peas at 6s.: if measured by the quarter, say wheat thrashing 2s. 6d. and carrying 1s. per quarter, this at four quarters per acre will be 14s.; barley, at 2s. 6d. and carting 8d., at five quarters, 11s. 8d.; beans, four quarters, at 1s. 6d. and carting 1s., 10s. per acre, and so on. This is one of the most ready modes of settling, and is very fair, as the incoming tenant, having the horses upon the farm, is enabled to carry out the corn without much inconvenience.

The hay is the next consideration. The market value being found, one-third is deducted to meet the cost of marketing and carting out, and bringing back a suitable quantity of manure if sold, an allowance of one-third partly meeting the question.

These items will be found to comprise all the subjects that ought fairly to be valued, and which constitute the ordinary valuation. To provide for the well-cultivation of the farm to the end of the term, permanent improvements, carried out during the preceding four years, ought to be allowed and paid for. Draining, if done by the tenant within that period, should be paid for to half the cost; and so of any like permanent improvement, such as would extend throughout an entire term of fourteen years. It would, however, not be desirable to burden the landlord, on the one hand, with too heavy payments of this nature; but the tenant should, notwithstanding, be partly compensated by way of inducement to proceed, so that, either event occurring of quitting or continuing the occupation of the farm, he may be placed in such a position that the least possible loss should accrue to himself or to the farmer.

I believe I have now adverted to the principal items ordinarily coming under valuation, and I propose, in an appendix, to show how such valuation would be best carried out, and the proportion per acre that they would carry out upon the entire farm; and it has been my study not to increase the amount of valuation beyond the actual necessity of the case, at the same time paying to such an extent as to insure equable cultivation to the end of the term.

It has happened throughout my practice to observe that tenants, farming under leases, for the most part make a large investment in the soil at first, which they gradually exhaust as they approach the termination of the lease. Now, it must be apparent to every one connected with farm management, that a farm onght to continuously advance in improvement; and, under due restrictions and a well-defined lease or custom, such would be the case. But tenants are too apt to imagine that in such event their rents would be advanced, inasmuch as the improvement remaining would be a sufficient inducement for a stranger to give an advanced rent in consequence. This certainly ought to be obviated to some extent by the mode I have recommended, and which applies only to the termination of the lease; but the restrictive covenants of the latter frequently deprive the tenant of the advantages he ought to derive under good management. I will now consider what the nature of such covenants ought to be, to insure it. It is advisable in all cases that a lease should exist: the mere custom of a district is never sufficiently defined to admit of an occupation being carried throughout to the close in a satisfactory manner. But a lease for a long term is to some extent an unsatisfactory bargain. The landlord might suffer by parting with his estate for the period stipulated; prices might so alter as to render it a bad bargain, either for one party or the other: to obviate this, the rent should be subjected to a rise and fall in amount annually to meet the occasion. A corn rent, however, depending entirely upon the price of wheat or grain, would in many cases not operate beneficially. Grain might fall so low from the peculiar circumstances of season, blight, or other causes, as to materially affect the income of the landlord; whilst at other times it might rise so high as to affect the tenant in like manner, by calling upon him to pay a greatly increased amount of rent at a time probably when he did not derive a proportionate advance in his produce. In a work lately published, entitled "Bayldon on Valuing Rents and Tillages," as editor I treated upon this subject, and advanced in principle what in my experience I had found to work well, viz., to pay a moiety of the entire rental in money, and the other moiety to be dependent upon the price of grain. By this arrangement the fluctuation would be lessened, and neither party become seriously affected. Another mode has been adopted, and is equally to be recommended, viz., assuming the amount of rent, with wheat upon an average for the last three years at 6s. per bushel, to be at the rate of 4 bushels or 24s. per acre, and that the average should be in the first year 7s. per bushel, by striking off the first year and adding the last, the average of the three years would be 6s. 4d. per bushel for the current year, and the rent 25s. 4d. per acre, the averages to be deduced upon the first market day in each month, as published in the *Gazette* or neighbouring market. By this mode the fluctuations in amount of rent could never be excessive in any single year, the average of three years always coming into account. Some persons, however, from prejudice, would not adopt a corn rent; but it must be obvious to every one who dispassionately investigates the subject, that rent and the value of produce ought always to be proportionate with each other. In cases where leases for long terms are objected to, a lease might be granted for a single year, and to extend from year to year until either party should give to the other notice in writing to determine the occupation. In such cases provision should be made to pay for drainage and other permanent improvements, if executed by the tenant, in proportion as such improvements might remain unexpended at the end of the occupancy.

Although upon some estates the tenants continue to farm from year to year without either agreement or lease, and a good understanding has prevailed, still it must be a most objectionable mode of proceeding, and should be avoided as far as possible, as everyone must have been convinced from the recent occurrences that have taken place that all transactions of this nature ought to be carried out as any other description of commercial transaction; and whether extending over a long or short period of time, the principle and stipulations of the bargain ought to be clearly set out and defined in writing, so as not to admit of a doubt as to the intention at the end of the term; nor would it be advisable to clog such an agreement with such stipulations as to the mode of cultivation or of quitting the farm upon so short a term. This would to some extent be useless, inasmuch as the landlord could at any time repossess himself of the farm, if he found the tenant was not cultivating it properly. At an early period, when no more manure could be obtained beyond that produced upon the farm, it was necessary to guard against straw, hay, and roots being sold; but it must be obvious, that when it might be done by the tenant, that he should not be prevented selling such descriptions of produce upon bringing back upon the farm two-thirds of their value in manure. In the case of repairs, some well-defined system ought to be adopted—admitting that the landlord finds all materials and pays half the cost of labour, the premises might be maintained in good repair and condition, so as never to cause at any one time any large expenditure, as is too generally the case, though I cannot recommend that the tenant should be exonerated altogether, and charged a proportionably higher rent. I, on the other hand, think that repairs are better done by workmen employed by the landlord, and some proportion of the outlay only be charged to the tenant, so that in any given year the sum ought not to exceed 1s. 6d. per acre. There ought to be sufficient inducement for the tenant to assist in keeping the premises in proper order, and which he would endeavour to do if called upon to pay a proportion of the cost of repairing them from year to year. The fences upon the farm should also be well repaired as soon as they require it, or the tenant be charged with the cost for his neglect.

The customs of different districts vary so greatly that I fear it would be difficult to introduce any one of general application; still by defining one least liable to objection, all others may be made to approximate in degree, and in course of time be brought more in accordance with each other.

Having digressed considerably from the subject as put down upon the card, I may be allowed to state that I have felt it necessary to state what the management, as well as the tenure, ought to be, to insure the determination of the lease upon the best and most approved principle. The landlord's interest ought to be protected to such an extent as only to prevent the tenant from taking undue advantage at the close of the term, at the same time taking precaution not to load the tenant unnecessarily upon entering the farm with payments—the less sum he has to put down at the commencement of a term, the larger amount he will have to carry on the farm throughout the entire lease. Some parties, however, object to this mode, as they state it allows persons with a small amount of capital to compete for large farms. This argument, however, has little weight. It must be obvious that the charge upon a large amount of capital produces an increased expenditure without a return annually, and therefore ought to be avoided. Landlords would do better to ascertain beforehand the capabilities of a tenant, in a monetary point of view, to take a farm, rather than to load him with heavy payments to insure it.

During my experience I have had opportunities of obtaining considerable knowledge of the working of the various modes by which tenants enter upon and quit farms, and, without egotism, I consider the system alluded to by me in the first instance as the best adapted.

The out-going tenant ought be allowed to make the fallows, if competent to do so. Horses must be kept by him for assisting in harvesting the crops, and he should have the privilege of ploughing and tilling the land until the termination of the last year of his term; the in-coming tenant, however, being allowed to come in to carry on the preparations in addition, as at first stated, and also to hoe and cultivate the root crops when considered by him to be necessary. The manure of the last year ought to be paid for in full, in proportion to the cost incurred in producing it. The hay and straw of the last year should also be paid for, as stipulated previously. The improvements of a permanent and enduring character should be also paid for in proportion to their value, when executed within a given period; and any erections, put up solely by the tenant, should be allowed to be taken away, provided the landlord refuses to pay for them, at such a price as they would be worth to remove. So all fixtures and machinery, put up by the tenant to enable him the better to carry on his pursuit, should also be allowed to be removed, if the landlord should refuse to take them by valuation.

I am quite aware of the difficulty incurred of introducing any new details; but as my object always, through life, has been to recommend such changes as would be most likely to become beneficial upon an extended scale, and, if possible, to introduce such a policy betwixt landlands and tenants as ought to exist, and, when existing, most likely to produce results of a beneficial character to themselves, but more especially to a community of persons, daily increasing, but limited to a certain space, upon which to carry out their exertions—then, I say, the utmost facility that can be afforded to them ought to be the chief aim and study of our united endeavours.

In conclusion, I may be allowed to say, that under all circumstances I think it best that the manure made in the last year of the term should be paid for. I have invariably observed whenever it is left gratis that very little remains for the in-coming tenant, and that is generally of very inferior quality; and although it creates a considerable amount of charge in the first instance, it will be found the most beneficial mode in the end.

I can only add, that I have been studious, as far as I am enabled, to state from my practice and experience what I consider the best mode of entering upon and quitting a farm. I have no private theory to carry out beyond that of benefiting a class from which I have received the utmost consideration and respect, and which it will ever be my desire to retain.

Some short discussion followed, on the subject of the lecture; and the proceedings terminated with a vote of thanks to Mr. Baker.

THE BANK CHARTER—ITS OBJECT AND EFFECT.

As many of our country readers may not be acquainted with the matters relating to the currency, and are consequently at a loss to understand the causes of the financial crisis under which the country is now passing, and which has so powerfully affected the grain as well as all other produce markets of the kingdom, the following explanation of the Bank of England Charter, and its effects upon the commerce of the country, may not be unacceptable.

By an act of parliament passed in 1819, at which time the Bank Charter was renewed, provision was made for a return to cash payments. In explanation of this we must state that in the year 1797 a crisis of a similar nature to that now existing took place, under the pressure of which the Bank of England *was compelled to suspend its payments*. Upon which, Mr. Pitt, who was then Chancellor of the Exchequer, issued an order in Council authorizing the Bank to refuse giving cash for their notes; and an act of parliament was subsequently passed declaring the one pound note and a shilling equal in value to a guinea in gold, and making bank notes a legal tender, inflicting a penalty upon any one refusing to accept them in payment for goods or otherwise.

This act continued in force until the year 1819, when, upon the question of a renewal of the Bank Charter being brought forward, the Restriction Act, as it was called, was repealed, and the Bank of England from the time the act came into operation was nominally obliged, like any other bank, to pay its notes in cash when required to do so by the holders. No restriction, however, was laid upon the Bank by this measure as to the amount of notes to be issued by it; that question being left entirely at the discretion of the directors, to manage it according to the supposed requirements of the commerce of the country.

In 1844 Sir Robert Peel found himself at the head of the Government, and the question of the renewal of the Charter of the Bank of England being again agitated in Parliament, he brought forward and carried a bill, by which material alterations were made in the management of the Bank, the principal of which were as follows:

First. That the two departments of the Bank, namely, the bank of issue, and the bank of deposit, or common banking business, should in future be kept entirely separate, so that the funds of one should not be available to, or be interfered with, by the other.

Secondly. That the issue of notes should be restricted in amount to the value of the gold held by and the securities deposited with that establishment. It is here proper to state that, by an arrangement of long standing, the capital of the Bank was taken *on loan* by the Government, for which securities are held; the Bank being allowed to issue notes to the amount.

Thirdly. The Bank was required to give a weekly instead of a quarterly account or statement of its liabilities and assets, to be made up every Saturday night, and published in the *Gazette* the following week, the two departments of issue and deposit being kept separate in the statement.

These, so far as the Bank of England was concerned are the most important arrangements provided for by the act of parliament of 1844-5. The two first, however, are those which were likely the most seriously to affect the commercial interests, according to the opinions of some of the most eminent financiers. Nor were they wrong in their conjectures; for in 1847 such was the position of the Bank, superinduced by the separation of the two departments, that the Government were compelled to issue a letter of licence to the Bank to set aside *pro tempore* the act of parliament, and make a transfer of coin from the issuing department to that of banking; the specie held by this latter on Oct. 25 being only £2,860,000, whilst the former held £5,570,000. Thus, whilst the one department of the same establishment was on the eve of stopping payment, the other was in possession of a sufficient sum to afford it relief, but was restricted by the act of parliament from doing so.

Since that period the gold-fields of California and Australia have unfolded their treasures, which have nearly all passed through this country, by which the Bank of England might have been supposed to be well supplied with bullion. And such, in fact, was the case for a time; for we find that in July, 1852, the amount of gold in the two departments was £22,040,000, being nearly half the liabilities (£46,480,000). But since that period, notwithstanding the enormous and unprecedented quantities of bullion continually since arriving at our shores, the quantity held by the Bank has as continually decreased, although to prevent it the interest upon discounts has advanced from 1¾ per cent. in 1852 to 10 per cent. in 1857, at which latter period (Nov. 11th inst.) the Bank Account for the week stood as follows:

GENERAL ACCOUNT.

Liabilities.		Assets.	
Bank Stock .	£14,553,000	Government Securities .	£14,475,600
Rest	3,364,356	Do., do.....	9,444,828
Notes in Circulation ..	20,183,355	Other ditto .	26,113,453
Public Deposits	5,314,659	Bullion and Specie ..	7,170,508
Private do...	12,935,344		
7 Day Bills .	853,075		
	£57,203,789		£57,203,789

And the accounts of the separate departments were as follows:

Dr.	Issue Department.		Cr.
Circulation .	£20,183,355	Bullion, &c..	£6,666,065

Dr.	Banking Department.		Cr.
Liabilities ..	£37,020,434	Specie	£504,443

Thus, by the prohibition of the act of parliament, or the Bank Charter, the banking department was reduced to such a dilemma as not to have more bullion and specie than would have paid *three pence in the pound* had it been required to meet all its liabilities; whilst its colleague, the issue department, was in possession of upwards of six and a-half millions, not available for its relief without an infraction of the act, amounting for the time to an abrogation of the Bank Charter.

Many important questions will be raised when the subject of the Bank Charter comes to be discussed in the approaching session of Parliament. Amongst these will probably be the inquiry how far a charter, granted in 1844, when the exports of British and Irish produce amounted to 52 millions sterling, and the tonnage of shipping entered and cleared at our ports was 10½ million tons, is applicable to our commerce in 1856, when the exports have risen to 96½ millions sterling, and the tonnage to 21½ million tons?

The cause of the decrease of gold at the Bank is, in part, the unfavourable state of the exchanges, or the excess of imports over the exports, which must be paid for in specie. But, independent of this, the requirements of the French government have compelled it to purchase bullion of the Bank of England at a heavy premium. The amount of gold and silver coined in France since 1848 is nearly 112 millions sterling, being respectively £88,351,000 in gold, and £23,681,000 in silver; whilst that coined in the United Kingdom is £52,438,000 sterling, or £50,378,000 in gold, and £2,060,000 sterling in silver.

We must not, however, conclude our statement without stating that the *immediate* cause of the financial crisis was the panic, and consequent extensive failures, in America, which stopped the remittances from that country, and produced a heavy pressure upon our banks. The letter-of-licence from Lord Palmerston to the Bank of England relieved the commerce of the country *for the time;* the object of Parliament must be to devise means to prevent, as far as possible, the recurrence of these crises, which cause so much distress in the commercial world.

WHO INVENTED THE STEAM PLOUGH?

SIR,—I have read with much interest in your journal for several weeks, "A Plain Farmer's View of the New Things in Agriculture;" and I am pleased to see, that, although he styles himself "A Plain Farmer," he is not a prejudiced one.

In your paper of November 16th he was pleased to notice Mr. Smith's and my own modes of steam culture; and it is with reference to his observations, and Mr. Smith's letter of this week, that I crave a place in your columns to correct an error into which they appear to have fallen, with respect to Mr. Smith being the inventor of the steam plough.

Your "Plain Farmer" says, "Mr. Smith shall next have my notice, as he has been indefatigable in the introduction of steam power to cultivation, *and also lays claim to being the originator of the modern improvements in steam ploughing.*" To which Mr. Smith replies, "I find it stated that I claim to be the originator of the windlasses and rope traction for ploughing by steam. I say Mr. Hannam made the first attempt, but failed; *and that it was I who first efficiently originated and applied them.*"

Now, Sir, in justice to myself, I beg to state, that three years at least before Mr. Smith entered into it I ploughed part of my farm with a five-horse engine; and as long ago as the *Lewes Cattle Show*, 1852, I took a model of a ploughing machine to that meeting, and showed it to Messrs. Clayton and Shuttleworth, asking them to carry it out, but they declined, and I have been obliged to manufacture and work it out myself. At that meeting I well remember Mr. Fowler (who made Mr. Smith's machine) was *draining* in a meadow adjoining the show-yard *with horses*, he not having as yet applied the steam engine to that purpose. In June, 1854, I took out a patent for a combined lever plough and cultivator, and in May, 1855 (previous to the Carlisle meeting), I patented my first mode of steam culture, viz., with one engine, to work both ways by means of a platform and pulleys at the opposite headland, the engine, machine, &c., to move forward *and keep opposite the work.*

On the same day I opened a discussion at the Central London Farmers' Club, "On the General Application of Steam-power to Agricultural Purposes;" and I mentioned the names of every person that I could ascertain had made any attempts at steam ploughing (Mr. Hannam amongst the rest); but Mr. Smith's name was not there, for the very reason, that, as yet, he had no hand in it.

All this I had done before Mr. Fowler contracted to make Mr. Smith's machine. The model, which I exhibited last year at the Smithfield Show, was made, that drawings might be taken from it; and if your readers and the public at large will refer to your paper of May 14th, 1855, or *Bell's Weekly Messenger* of the same date, they will find my predictions there stated, which are being more confirmed every day; and it will require no further argument than that discussion, and the dates that I have given above, to prove, amongst those who are carrying out the modern improvements in steam ploughing, "who was the inventor of the steam plough."

I have subsequently patented another mode of using two engines, *with machines attached, to do away with all friction of pulleys, and to require no more rope than the length of the field*, the same to move along the headlands, as before described, and which was exhibited at Salisbury. And also a method of making the common portable engines "*locomotive*," by means of a chain motion connecting the crank-shaft to the hind wheel; thus propelling themselves along. Your "Plain Farmer" will perhaps be pleased to know, that my two engines brought themselves and their respective machines home from Salisbury, a distance of forty miles, with the assistance of one horse to steer; carrying, in addition to the weight of the machine, 100 gallons of water and half a ton of coal, and only had assistance at two hills, which were very long and steep.

Your correspondent, who appears to me to have given a very fair and descriptive account of the several implements at work at Salisbury, says of my ploughs, "The ploughs are badly arranged." Now, I have no right to find fault with his decision, because their work was not such as I could have wished; but when I tell him that it was never tried till on that piece, and was the first I had made in that form being actually finished at Salisbury, and that being obliged, from want of power, to take off two ploughs on account of the impracticable position in which we were placed, *and consequently the line of draught being incorrect;* he will perhaps make some allowance for their performance on the hill, as on every occasion since they have made excellent work. The ex Mayor of Salisbury was much pleased with their work on his farm. Mr. Boydell has tried them behind his traction engine, and told me he never made such good work with a combined plough; and they have been tried in Staffordshire, making equally good work there. Your correspondent, who is evidently well up in mechanics, will perhaps form a different opinion of my ploughs when I tell him that, *by their construction*, they are capable of being altered in five minutes from a four-furrow or six-furrow plough to a ridge plough, by simply taking off the first, third, and fifth plough-bodies, and substituting a large steel broadshare in their stead. The work is then performed as follows: The first beam, carrying a broadshare, cuts and breaks up the soil, but does not turn it; the second beam, a plough, cuts its own ground, and turns it on the top of the other; the others alternately acting the same, throwing the whole into ridges or rafters, and the whole of it being broken up, it lies admirably for exposure to the atmosphere and the frost. Several farmers in Staffordshire told me, on seeing it work, "they should like all their land done like it."

I ought to apologise, Mr. Editor, for the length of my letter; but I know that anything relating to steam culture finds a ready place in your columns. And as on a past occasion, when a long controversy as to "Who invented the Steam Plough?" took place in your journal, I took no part therein, feeling convinced that—having proposed and introduced the subject of "Steam Cultivation" at the London Farmers' Club, previous to either of the disputants taking any part in it, and the publicity that was given to that discussion through your paper and several others, besides the Journal of the Club—that the public would give me credit for being first in the matter. However, it appears that "A Plain Farmer" was not aware of the fact, and possibly many more like him; I therefore consider it a duty I owe to myself to put this matter straight, as I am not only the inventor of the hauling machine, but it will be found that, ultimately, when brought to perfection, *my system of moving ahead opposite the work* will be the best.

I remain, Mr. Editor, yours faithfully,
J. A. Williams.

Baydon, Wilts, Nov. 24, 1857.

THE PROPER POSITION OF THE LABOURING MAN.

Reflections arising out of the Rev. C. T. James's eloquent address and the afternoon discussion on labourers' education we have already offered to our readers, We shall now give a few more, which, on the contrary, were never likely to occur to anybody from a perusal of what passed at the Farmers' Club. Our working-classes, having no newspaper, edited, contributed to, and supported by themselves, speaking their views and stating their wants and wishes, read what we write for them, and have their case always pleaded by men of a class above them. A journal, therefore, like the *Mark-lane Express*, representing all the interests connected with agriculture, whether owning, occupying, or labouring, should not be frugal of its devotion to the cause of the workman, while giving due regard to the rights and duties of the landlord and tenant-farmer. The subject of improving the educational condition of the agricultural labourer was or should have been treated, on the above occasion, in its relation to the exigencies of the farmer. We would now extend the topic in a somewhat new direction, bearing upon the welfare of the labourer himself, and through him of the whole community.

It is certainly worth while to persist in urging upon sluggish and short-sighted farmers that their interests would be advanced by doing a little bit of philanthropy among their work-people; and there are many ignorant masters yet left, who cannot perceive any good in making their men more thoughtful as well as more handy than they now are. But our intelligent men of business admit all you can plead on behalf of more extended education (that is, of mental, moral, and bodily training), and deplore with you that the thing remains so scantily and insignificantly done. Shrewd and calculating, as well as right-minded and benevolent men, agree that it would be better for all classes if labourers could have higher wages, earned more at piece-work than by the day, and were paid perhaps partly in bread-corn or barley for home-brewing. If their homes were more decent and comfortable; if they universally had rood-pieces for potatoes, grain, and garden vegetables (not omitting floral beauties by cottage-doors and windows), and did they all possess, if not the poor-man's Elysian blessedness of a milk-giving cow agisted by the master, at any rate a sleek economizing pig or two in the manure-making sty. You may add also every variety of sick-club, coal-club, savings-banks, &c., for providence and mutual help, and crown the list with evening-classes for adults, and time and opportunity for good training for their families, with, perhaps, athletic games and rural festivals in which all classes may cheerily mingle.

Still further, every one whose views are worthy of respect acknowledge that farmers are greatly to blame for their remissness in many of these matters; that clergymen, and squires, and people of influence and power are accusable of great neglect in some points; and that landowners and proprietors are impeachable with reference to others. Then again, the good ladies, who, like improvised Sisters of Mercy, parcel out "their poor" into visiting districts, tell us that personal improvidence and recklessness in the men, and a want of ability for cooking, soup-making, and working-up of domestic odds-and-ends in the wives, mothers, and daughters, are sufficient to account for much of the labourers' poverty. Even beyond these, there is the tee-totaller charging the brewers and publicans with being at the bottom of more than half the mischief and misery. It is a matter for general congratulation that we at last know and admit these things, and that we treat the labourers' case in a better spirit than we did. At an agricultural meeting, when the hard-handed, hard-headed fellows come up into the dining-hall to receive the golden honours for prize ploughing, and the careful old servant, housemaid, and the diligent scholar, or clever little needlewoman from the parish school, share in the distribution of rewards, the benevolent vicar or his indefatigable curate makes a fatherly address to this *élite* of the working-classes, fairly and good-humouredly adverting to the above-mentioned grievances—generally concluding, by-the-bye, with an earnest appeal against tobacco and the beer-shop, just as the health of the labourer is being drunk by their masters with "three times three." On greater occasions, too, our noble lords and right honourables, as well as plain agriculturists, in dilating upon the "operative" question, invariably enforce the principle that the men who slave for the community, for capitalists and gentry, have a right to receive education and assistance from the classes above them; and that it is the bounden duty of all, above the position of being drudges of society, to help their toiling brothers in proportion to the measure of their own affluence and prosperity. Thus, it is not only the selfish principle (or want of "principle") within us that is appealed. Something more is set before us than the mere advantage to ourselves of having better-fed, better-housed, better-taught "lower orders;" of having fewer pestilential and feverous courts and back lanes to involve our wealthier mansions in their subtle poisoning, and having fewer temptations of want and ignorance and vice pressing the poor to rob and hate and attack the rich. Our sense of fairness and honour, our sympathy and generosity are appealed to, and we are constrained to declare whether or not it is fair and righteous that our fellow-citizens, who strain their sinews, waste their energies, and hazard their health and existence most, should eat of the plainest, and be comforted with the hardest. Or, that they should dwarf and dwindle on dry bread, while the more fortunate and idle partake of the best of palatable luxuries. Our own sense of justness and fitness and propriety tells us that a condition of society in which the workman obtains the least part of Nature's bounties, and does not find that he is "worthy of his hire," cannot be in accordance with the perfect and normal government of the universe by a Providence of equity and mercy. Let us even confess that there is something wrong in our present social and economic arrangements for distributing the profits of the products of labour; doubtless permitted by the Ruler of the nations for a wise and righteous end, but which shall be adjusted and compensated for in that millennial age to which the world looks ever forward.

Now, no one will suppose that we are going to open up the theories and fallacies of "socialism," or to quarrel with our existing national institutions. All we want to impress upon the true labourers' friends is, that remedial and alleviating measures, good and necessary as they are, can only be of temporary effect, and should not be urged and agitated as if they constituted a complete solution of that perplexing problem, the "labour question." True, there is plenty of work for us, at present, in getting such measures as cottage-building, piece-work, allotments, and schooling, admitted and actively set-about in the right quarters; so that present distress may be allayed, present abuses removed, and a brighter prospect unfolded to the sons of toil. But so long as the framework, customs, and regulations of society permit and establish an imperfect, unequal, and therefore dangerous appropriation by different classes of the nation's industrial earnings, all such measures will fail to reconcile the working-classes to their position, or make them as happy and contented as they should be. Anyone who considers the general condition of society at the present day, must see that only by a vast change in the character, sympathies, and customs of the various classes of the community, can there be a period inaugurated in which men shall always be able to command their reasonable share of the national store of food and comforts, as well as of leisure for mental culture. But in effecting this alteration, there is no necessity for any sudden or violent organic change in our social or political state. Neither need we wait until the Christian rule of "doing unto others as we would they should do unto us" shall be the inspiring motive in every man's heart. By means of sentiment and habit slowly growing up among us, and as a step toward the attainment of the prophesied world of honest men, we believe it will be possible for all classes mutually to agree as to their respective functions, duties, and just scale of remuneration; so that inequality and oppression shall be individual, and no longer inflicted by one entire class upon another. And this time will arrive only when men are qualified for the work allotted to them, and when that work is always such as reasoning, reflecting human beings may be satisfied to spend their life in, and earn their living by. This, then, is the point we would enforce—that the only permanent and safe condition of the working-classes is when their position is fairly and honestly *as good in its way* as that of other classes. When no man who is too weak to rise out of this situation in life need be ashamed of or disgusted with it.

There are two ways of endeavouring to bring this about—one consisting in measures for securing the labourer better payment for his toil, either in wages, household comforts, or educational privileges; and the other seeking to improve and elevate the nature of *the work itself*, rescuing the workman from occupations purely animal or mechanical, and employing him in such as engage the faculties of his mind.

We continually hear suggestions for aiding the former, but very seldom for advancing the latter method.

One of the saddest facts connected with the condition of many of our working-classes is, that a worse than the primeval curse has fallen upon them. "In the sweat of thy brow shalt thou eat bread," was the judgment pronounced against Adam and his posterity. Alas! how many of our labourers have come to suffer this penalty in its narrowed literal meaning—eating "bread" and bread only, often not a sufficiency of that, in recompence for "the sweat of their brow!" But with the progress of machinery, the increase of population, and an enormous consumptive demand for cheap articles of prepared food, manufactured apparel, furniture, and workmanship of art and ornament, there has gradually crept upon the "operatives" a worse form of laborious occupation than is included in this figure of the perspiring brow—unless, indeed, the expression be not only metaphorical, but symbolical. This may be taken to indicate that fearful, horrible, and cruel wasting of the souls of men in forms of labour engaging only their animal power, and calling for no exertion of their minds, which has become a necessity of actual existence to tens of thousands of pale men rightly named "mechanics;" as also to others proudly classing themselves in a higher grade of occupation. Our "mills" and "works" abound with men and women, young and old, who would rejoice might they but vary their bodily labours and revive their mental languor in work that had *thought* in it—in processes but the least elevated above the monotony of recurrence, repetition, and relentless copying. The joiner has scope for contrivance and invention in laying-out a window-sash of a new pattern, or a staircase of novel combination of curve and pitch; but look at that workman in the tool-factory, who does nothing for days, months, years, but cut out with a turn-saw rough wood handles of a shape marked out for him, never finishing or varying one. Or look, again, at that old man bending over a saw, and tap-tapping its teeth with its ceaseless hammer to give them the right "set." The accurate touch of his blow is marvellous, but for years and years his daily life has been consumed in as unintelligent a task as that of the horse pacing round his infinite mill-walk.

Bodily toil, even excessive at times, is healthful and invigorating both to the physical and intellectual faculties. But to labour your whole day, and every day for a life-time, at work which has no progress or diversity in it, no space for design or the exercising of the gifts of a man's soul ever so humbly upon it—this is true slavery. In extorting such protracted changeless labour of body, or unrelaxed attention, to details admitting of no improvement by the thought of the workman, we are making not only a slave, but a machine of our brother—causing him not merely to yield us "the service of his body" but to relinquish for our benefit the right and opportunity of exercising his mind. We are using his body and soul in lieu of machinery of brass and iron. Not that we blame capitalists, however, for manufacturing and consuming, or accuse the upper classes of living by such repression and degradation of the lower. By no means; for we are all in fault. And the factory-girls spend years in tying threads, in order that the poor housewife elsewhere may procure cheap calico; and the lad grows up to manhood in the din of the railworks, feeding strips of metal into the cutting engine, in order that we may save in building and constructing. Machinery has wonderfully extended knowledge and a high order of skill among workmen. Still at the same time it has made immense numbers of human beings into mere machines; and we believe that one of the best means of inaugurating a happier condition of the labouring-classes, is to introduce wood and metal wherever it can be economically made to take the place of human nerves and muscles and a low order of mental attention, confining manual labour to operations requiring thought, and exercising beneficial effects on the character of the workman. One of the finest pieces of education is to instruct a youth in the use, and entrust him with the care, of a machine or process needing the energy of his mind; and one of the worst kinds of intellectual degradation is to bind him ten or twelve hours a day to labour, for which the "unthinking horse" or other dumb beast might be equally fitted, had it hands instead of hoofs. What a difference in ability and independence of thought between the turner who holds the tool to the lathe, or the potter who shapes the vase upon the wheel, and their men who merely actuate the crank! What a distance of inferiority between the labourer that carries bricks to the scaffolding, and him that lays them in lintels or "string-courses" of his own designing!

While many have pitied poor Hodge, or rather the smart intelligent ploughman and carter that he is rapidly becoming, we do not know that anyone ever discovered the superiority of Hodge's kind of work over many tasks performed by the quick-fingered "division-of-labour" factory-folk. But think of the variety of his toils—of his judgment in guiding a team, or feeding a bullock—in straightening a furrow or paring a sheep's foot—in managing a drill, or sloping the banks and levelling the bottom of a ditch! Is there not selection and calculation in the plashing of a hedge; and taste, as well as tact and skill, in the building of an elegant and noble rick? True, there is still the old toil of filling dung-cart, for which strong-armed and weak-headed men are proverbially said to be fitted. But the progress of agricultural mechanics is gradually relieving the labourer of his more excessively mechanical toils. He is delivered from the long winter discipline of the flail; relieved of shaking-out grass and raking it up again as hay. He has been partially freed from the hoe; the steam engine, in large farmsteads, cuts, grinds, and crushes for him, leaving him to study the wants and comforts of the animals under his charge. The reaping machine has well-nigh saved him from the racking scythe and arduous sickle; the steam plough will soon make tillage-labour his pleasing occupation instead of his burden. There might also be a satisfactory comparison between the amount of happiness and mental satisfaction which Hodge finds in the nature and objects, and in watching the successful issue of his toil—the beasts turned-out fat for market, the crop prospering under his toil and attention, and so on, against the mere knowledge of having knocked-off so many pens or buttons per day, and seen them packed in boxes, never more to be heard of.

Some readers may fail to see at once how the elevation of the nature of his employment is to accomplish much in benefiting the labourer's condition. But just consider that some masters, as well as men, hold sentiments on this matter, and act in a way which may be stigmatised, without harshness or extravagance, as a species of brutality. They care only to keep their men at hard work, no matter at all what the nature of the work may be, provided it answers their purpose of profit—careless that human minds should be smothered in mere bestial occupations, with the natural result of debasing both the slaves and their task-masters. Such employers never consider *what sorts of labour are good for men*, and would have men and women dragging ploughs and harrows, if it were only legal, customary, and would pay.

But we ought not to reckon our labourers as so many "hands" merely, as the statisticians do. We are not to calculate the water-power, wind-power, steam-power, horse-power, and *manual-power* on an estate, as all alike in value, according to the number of pounds avoirdupois it can raise one foot per minute. We are blaspheming the work of God to do so—who "made man in His own image." Rather let us say, We have so many minds on our estate, each capable of more or less exercise in invention and study; and the aim should be to produce the highest result of yield and profit from the land, with the least harm and greatest improvement to the mental and moral powers of the workmen.

Again, reflect that if the masses of our population (who have the heaviest of the national work to do) are ever to be thinking, well-cultured men, and everybody must wish they were so, for the sake of humanity, morality, and religion, *they must have work that they can take pleasure in*. If labour is to continue to be so extensively only a mechanical slavery, the further you extend education and power for thought, the more dissatisfied will labourers be with that drudgery; and all the wisdom and power of the rich and titled will not hinder them from rebelling against it. Men have no right to be made to toil in that which they abhor, and which holds down their mental energies, if there be any means for making machinery perform it instead. And there are many cases in which, if mechanism cannot be economically applied in such work, the product can be dispensed with. We honour those who preach the dignity of labour, and strive to introduce whatever means may avail to make the workman's toil more pleasant to him.

Let our readers meditate on this subject. Let them consider that if "education," when left only to earliest youth, to evenings and spare hours, yet brings happy results, how much more may be done by altering and exalting the character of such occupations as absorb all a man's day in what is strictly and rigidly machine-like and material! We have alluded to the introduction of improved farm-implements as having in many ways lightened the pressure of the labourer's work; but there are other measures required—such as the relieving of boys and girls, and also women, from the painfully demoralizing system of field gang-work; the substitution of contract-work for much that is now unnecessarily done by the day, and other methods of giving the labourer a direct personal interest, and therefore of pleasure, in the task he is performing. We only urge a greater attention to the principle of employing men as much as possible in suitable operations, affording scope for the greatest exercise of what thinking faculty they may possess—leaving practical suggestions and applications for business-people to discover in the course of their daily arrangements and pursuits.

THE EDUCATION OF THE LABOURING CLASSES—CONSIDERED AS A NATIONAL QUESTION.

The education of the poor has ever been a stumbling-block, and so it must continue, so long as sectarian differences continue to exist, and to counteract the efforts of each other. An exemplification of this took place at the last discussion of the London Central Farmers' Club, where the different speakers took entirely different views of the question; while the testimony of what had taken place in their localities exhibited how badly the present plan worked, and the necessity of a general revision of the whole system. The Rev. Mr. James appears to have imbibed the same opinions that pertain to his class, that it is the bounden duty of the upper classes to provide education for the poor. As a Christian duty, it undoubtedly is so; but at the same time we must admit that it is the first duty of parents to provide education for their children, and when unable from poverty, it then becomes the duty of the state to supply it. It is to the wellbeing of a civilized community, that all its members should be educated and trained in their religious and moral duties, as well as provided with the means whereby afterwards to obtain a subsistence. So that the present system, as supported by voluntary subscriptions, which always press heavily upon the charitable and well-disposed portion of the community, should be equalized, and borne by the property of the country, and be paid through the same channel as other national charges. Until this system is adopted education never can become general. We cannot admit that knowledge is power, without at the same time admitting that knowledge is wealth—therefore the educating a child is in fact conferring upon it the benefit that it would derive were it given the sum of money considered as the equivalent.

The middle classes of this kingdom are sufficiently aware of the importance of education as to induce them to bestow it upon their children sufficiently to enable them to enter into the pursuits of after life, similar to their own. It is one of the most expensive charges that they have to contend with, as it very frequently happens to persons of slender means, averaging from £100 to £200 per annum, that the education of their children, even when carried out with economy, amounts to one-third of their entire incomes. In times of pressure, such have fallen upon the farmer, the amount of education conferred on their children has been totally inadequate to their requirements, and far below that frequently bestowed upon the children of their labourers, in such parishes as have schools endowed, or supported by the donations of well-disposed persons.

We maintain, therefore, that it is the state that is bound to provide education for the poor—not only to insure it—but also to compel all persons having property to contribute in fair proportion to their means, whether inclined or not, to promote so desirable a result. As a state necessity, and still further to ensure it, parents ought to be assisted, to enable their children to be educated until they attain the age of twelve years at least, or until they are enabled to read and write sufficiently well.

We are of opinion that it is unnecessary to teach the children of the poor anything beyond reading, writing, and simple arithmetic, accompanied with sound moral inculcation and religious teaching, such as the state is bound to provide; beyond this, it is the duty of the parent to provide, as the means of furthering the progress of his children through life; neither is it necessary, as it cannot be expected that all men and women should be equally endowed with mental ability—the different grades of society do not require it, neither would it produce what Mr. James so strongly contends for—skilled artizans and labourers. That department of education does not pertain to the schoolmaster, but devolves upon the parent to complete, either by his own tuition, or that of others appointed by him to the task.

In rural districts the necessity or carelessness of parents is the main obstacle to the education of their children. We know that the utmost difficulty exists in procuring scholars for the schools, and even when procured the irregularity that prevails prevents the education of the child proceeding steadily, or continuing long enough to become of any material advantage. The ideas that prevail among the dissenting classes of the poor too frequently operate to their own injury, especially if the school happens to be an endowed one, or in any way under the control of a clergyman. On the other hand, the strict discipline enforced by the latter in the teaching of children has the effect of driving away many from the school that would in its absence have been too glad to have attended.

Such is the difference in the natural endowment of the human mind, that education becomes only the stepping-stone by which men become advanced—the most skilled artizans are those who frequently have been the least educated—the same also holds good with our agricultural labourers; and so long as the one continues an artizan and the other a labourer, education simply considered would not have produced a better workman. Not that we advocate the opinion of some masters that the "weak in the head and strong in the arm make the best labourers," but we contend that skill and tact are natural abilities that become advanced by practice, rather than by education. But if we look more deeply into the question, we believe that education by teaching a man his duty, enables him the better afterwards to fulfil it; and if the education of the school is supported by the example and teaching of the parent the greatest benefit must inevitably follow.

The greatest obstacle to morality with the labouring youth arises after they have quitted school, and before they become settled in life. So soon as they can earn sufficient to emancipate themselves from their parents, an era which usually commences at the age of fifteen, they become their own masters, and without any control from their parents, seek at the alehouse, that comfort which in most instances could not be found at home—a comfortable fireside and "jolly companions." During the interval betwixt that period and manhood, the good instruction bestowed upon them previously becomes too frequently lost.

The advantage derived by evening schools has been insisted upon, but this would be made available to a large proportion of the labouring youth; during the winter months only, could any attendance at all be obtained, and even then many hours would require to be filled up beyond those actually spent here. In all populous villages the school-room might be converted, at other times, into a reading-room, and at the trifling expense at which books can now be procured of an amusing and instructive character, the experiment is well worthy the attention of the benevolent, and would probably, in proportion to the outlay, be one of the cheapest modes of supplying the wants of the labouring classes.

The experience produced by our union schools is not very satisfactory, the children are instructed in the elements of learning but are perfectly helpless, as Mr. James expressed, of the best manner of using their arms and legs. This arises in a great measure from most of our unions not having sufficient land upon which to train them in such employment as they may be called upon in after-life to perform.

In conclusion, we can only state, that although insuperable difficulties appear to invest the question, we believe that they are more imaginary than real; and if the task of laying down a system of national education was only set about in earnest, and with a desire to prevent our prejudices operating so as to overcome our reason, we should very soon become convinced that it was no very difficult task, and feel surprised indeed, that it could have been so long delayed in execution.

THE STEAM-ENGINE AND OTHER MACHINERY TRIALS FOR THE CHESTER MEETING—SUGGESTIONS.

I have been much interested, as also greatly amused, by reading the various observations and suggestions made by the respective manufacturers of steam-engines, thrashing-machines, mills, chaff-cutters, &c., &c., relative to the triennial trial of these classes of machines, as already arranged to be tested at the ensuing meeting of the Royal Agricultural Society, to be held at Chester. How they are to be met I cannot conceive; and yet very many of them are truly valuable. I will try and combine the sense of them, and perhaps indulge in a remark or two upon them in passing.

Triennial Trials. — The first observation I shall notice is that of triennial tests of merit, by which a larger number of implements and machines may have a chance of a more extended and a more efficient trial. I find this plan is generally approved of in its essence, but grave objections are made to its full efficiency. These objections will certainly lie. It is not right that every trial should invariably be made at the time of the meeting, whether circumstances are favourable or not. Ploughing, for instance, should only be done when the soil and season are suitable. Reaping should only be performed upon ripe crops.

Medals or Diplomas —The next thing I shall notice is the suggestion to set aside money-prizes as a token of merit, and substitute medals or diplomas. I don't like this. A money-prize is undoubtedly no great object to a large and wealthy firm: a medal is always in view; but how many poor, hard-working men have come out as clever inventors and mechanists, to whom the chance of a money-prize has been a great incentive, and, when obtained, a great help! Besides, Old John Bull looks to the money: his pride does not consist in a medal encased in morocco: he loves to hear the chink; on hearing which he *will* work.

Trial of Steam Engines. — The trial of steam-engines I will next notice. It is one of high importance' and is the most valuable investigation to be made at Chester. It deserves the utmost care in perfecting all the arrangements for a satisfactory and conclusive trial. For this purpose the society puts forth certain conditions to be observed by competitors. This is right enough, to a certain extent: it is quite right to cause exhibitors to particularise and define the amount of horse-power, the thickness and quality of the boiler-plates, the diameter of the cylinder, the length of stroke of the piston, the number of revolutions of the crank-shaft, the diameter and weight of the fly-wheel, and also of the driving-pulley and its width and speed, together with a sectional plan of the boiler, showing the action of the fire upon the flues, and stating the area of fire-surface, and the clear water-space between the tubes; this is perfectly correct, but beyond this I don't see that more ought to be required of them; all other matters should be left to their discretion. The trials, I presume, are intended to ascertain and prove the value of the engine under trial, with all its merits or demerits, and with all its improvements and additions, be they good or bad, as exhibited before the judges by the sanguine exhibitors. The Society should be provided with every necessary scientific apparatus to test the *power*, to prove the quantity of *water* used, and the amount *of evaporation*. Indeed, every aid must be offered by the Society to insure a perfect trial; but every manufacturer should be left perfectly free to take his own course in the construction and manufacture of his engine. It is for the judges to say if he has succeeded in producing the best in his class. I take it as a necessary adjunct that exhibitors shall be required to state of what and how such parts of their engine is constructed, which does not appear to the view of the judges; beyond that, the judges should detect any defect, or note any progression, and the Society should always have the power to take to pieces any engine for examination, if required by the judges. In arranging for the trial of these engines, the coal should be of the best bituminous quality, equally broken and clear from rubbish or dust, all accurately weighed from the same heap. The trials should take place under a suitable shed, containing the engine and dynamometer.

Thrashing Machines.—The grain to be thrashed should all be from the same stack, and the sheaves should be weighed as well as counted. The trial should take place also under a suitable shed, and should extend to fifteen or thirty minutes each, during which time every circumstance in the working and dressing must be carefully noted by the engineers and judges, and the produce weighed as well as measured, thus making a double test —the weight and quantity—the greater weight proving the better dressing.

Mills of all kinds.—At the Lincoln Meeting a standard sample was crushed or ground, and time given for exhibitors to adjust their mills to this standard, and from this point the adjudications were made. At Carlisle, the best samples produced with the least waste of power was the chief guide. This was carefully tested. I recollect seeing a mill there dancing about under trial most amusingly, owing to ill-regulated power. This is a great point for consideration. They should have thirty minutes each for a trial, and time for adjustment for different qualities of flour and meal.

Chaff Cutters.—These are very various in make and adaptation, and qualified for cutting different lengths. In trial all should be set to accomplish the same kind of work, and to cut the same length of chaff; otherwise no real test can be given. It is suggested that some foreign material be used along with the straw, to show the length, *i.e.*, a piece of soft wood, or slip of pine. This would be serviceable. The break or dynamometer will prove the power absorbed, and the measure the quantity.

Dressing Machines.—These, if possible, are more varied in pattern and uses than chaff-engines. These machines should be made capable of performing all kinds of dressing, from the foulest corn to fine seeds. The dynamometer readily shows the power used. The judges decide the work.

Adjudication by Points.—The last thing I shall notice in this short paper is the novel mode suggested by several manufacturers for arriving at a satisfactory adjudication, viz., by the representation of a given number of points. Take Messrs. Ransomes and Sims' suggestion as to points.

			Points.	
	1. Durability,	to count	20	100 points.
	2. Simplicity,	„	20	
	3. Material and workmanship,	„	20	
Duty done on	4. Consumption of coal,	„	20	
	5. Portability,	„	10	
	6. Price per horse-power,	„	10	

What work for judges, even with this defined for their guidance! What is to rule them? If one machine is somewhat better finished than another, is it to count 20 points; and the other, of which the judges have a wavering opinion as to what is best, to count nothing? Again, the latter may be the most simple in construction by some slight difference, then it counts 20; the first nothing, and so on. Then what are the tests of durability but material and workmanship? and so both get the 20 points. Then again, what is portability: a light frame on light carriages? That would never do; yet it gets 10 points. Again, price per horse-power? Why it seems the lowest-priced or the least costly make would win here, when generally the best-made engines are the most costly; yet it has the 10 points. Consumption of coal has something definite. Here a test can be applied; so we will give the 10 or 20 points as these gentlemen suggest. In many machines similar results may be obtained. Thrashing-machines, dressing-machines, chaff-engines and mills might possibly be so determined, because they each have many "duties" to perform, and a given number of points might indicate grades of merit, but it would be very indefinite. If points are to be adopted as an index of merit, the division must be free and open; it must be left to the discretion of the judges to place such a number of points to the *merit* as it is entitled to, and not have it defined for them. What bones of contention! Points—defined points—will never do; they would frequently bring inferior machines and implements first. I have often seen splendidly-made machinery which was of no practical use. The mill I have named was precisely of that class: it appeared of beautiful manufacture, but the *break* proved it worthless. I see no true way of solving these difficulties better than to trust to the free unprejudiced judgment of really good practical men, aided, as they now are, by so many true mechanical and scientific powers. The power used can be detected to the greatest nicety by the dynamometer. The quantity and evaporation of water can be ascertained by the water-meter. The coals can readily be weighed, and other matters can be proved, so that, in fact, the judge of implements and machinery is vastly aided in coming to a decision; and he has, for the most part, mainly to exercise his judgment as to the quality of the work performed.

THE BIRMINGHAM AND MIDLAND COUNTIES FAT CATTLE AND POULTRY SHOW.

As an agricultural exhibition, that at Birmingham, even as a commercial speculation, should be eminently successful. It enjoys, in a word, just double the attractions of any other such gathering. Quite as many, or more, people go to see the Poultry than there do to see the Stock. Whereas at other meetings the cocks and hens are of little consideration, and half the visitors most likely never look at them. Birmingham, from the very first, has had a long lead in this respect that has never been approached. We have had Poultry Shows in Baker-street and at the Crystal Palace. The Royal Agricultural Society itself has ventured on a few mild accessories of the kind. Even exhibitors, however, think comparatively very little of them; while on the other hand, taking the prize for the best pen at Bingley Hall is something equivalent to winning the Derby, or the Gold Medal at Smithfield. Still, in the very face of this, with everything as well done as it could be, the funds of the Midland Counties Show have not been in too flourishing a condition. The fact is, or was, the Society, like many an individual ere now, had over-housed itself. Bingley-hall is, by this, proverbially well known as the best show-yard in the three kingdoms; but then, unfortunately, it is nothing more. For fifty-one weeks in the year the Hall is little better than a dead letter. The Bounding Brothers may occasionally, for a day or so, display their athletic forms, or Madame Robinsino pirouette from the back of a piebald steed. But beyond this the Society has so far had little to aid them in paying so large a rent; and consequently, although they have done everything to ensure the attendance of visitors, they have still had serious difficulties to contend with. There may be something of a lesson or a moral in this. There is scarcely a spectator or an exhibitor enters Bingley-hall but says at once, "Ah! we ought to have such a place as this for our London shows!" We were told as much, over and over again, during this past week. But yet a little reflection, ere we proceed to such a step, may be not altogether unadvisable. Whose money is to build? What shall we do with our hall when we have no fat cattle to put in it? And would it be sure to be a safe speculation in other ways? The Birmingham Show has, we repeat, the best place for its meeting of any we ever entered; and the one great drag on the Society is this self-same capital place!

It must not be supposed, however, that "the Midland Counties" is in a desponding or declining condition. The reverse of this is the case. The Council last year boldly faced their rent-difficulty, and, by a little exertion amongst themselves, have, we believe, nearly conquered it. As for the Meeting, it is now better supported in every way than it hitherto has been. The Society gives more money in premiums, the exhibitors enter in greater numbers, and the character of the Meeting is manifestly improving. The Poultry Show no longer depends on monstrosities or "rages," but is really what it should be—a collection of useful birds. As a gathering of stock, again, the weak places have been gradually filled up, more particularly within the last year or two; since care has been taken to avoid any further collision with the Smithfield week. The Birmingham Meeting has still its own especial features in full force—its Herefords and Long-horn cattle, Shropshire sheep, and Tamworth pigs. But it has, with these, other sorts as well represented; and is, indeed, a Midland Counties Show no longer. You may look to the best of their breeds here almost as certainly as you would in London; and we shall be by no means surprised to see the Gold Medal beasts of Bingley Hall equally distinguished this week in Baker-street.

It will be rather strange if they are not. Mr. Shaw's Hereford ox and Colonel Towneley's shorthorn cow are two as fine specimens of their several breeds as were almost ever seen. Were it not for a little dip in the back of the ox, or had the cow only a rather better head, either might have been passed as perfect. Mr. Shaw's beast is a magnificent animal, of immense length and depth, with all the good points of the Hereford beautifully developed. There was no mistake about his claim to the Gold Medal; while it is a pleasure to see this carried off by a new man. Beyond the local shows of his neighbourhood, or as the exhibitor of a few good sheep at this show, Mr. Shaw's name is not a familiar one in the catalogue; and the only previous occasion, we hear, on which this ox had been shown, was at Rugby within the last fortnight, where of course he was also placed the first of his class. Colonel Towneley, the owner of the Gold Medal cow, is far more generally known as a successful exhibitor, and this cow herself has some fame in our show-yards. She is, moreover, not only one of the best looking, but one of the best bred of her kind. As recently as the end of last July "Victoria"—for so is she called—was declared to be the best Shorthorn cow at the Salisbury Great National Meeting. She was also the best of her year at Chelmsford in 1856. She is of capital proportions, roomy, and of excellent quality. She is just four years old, and has had one calf. The first prize breeding boar at Salisbury was the first-prize fat pig at Birmingham. So that, in point of fact, the breeding stock show of the Royal Agricultural Society is becoming a mere "feeder" to our fat cattle shows of a few weeks on. You are told to admire a magnificent beast or a good pig, and think to yourself how much such animals will do, now their merits are known, to improve our breeds. Most impotent conclusion! By Christmas-day they will be selling as beef and bacon.

There is another bad habit creeping into these meetings, that may be very appropriately noticed here. For the last few seasons the entry of Devon cattle has been gradually getting better and better at the Midland Counties anniversaries. This year the improvement is very marked. Lord Leicester takes the two prizes for the oxen or steers, with a pair of his own breeding. The first prize is one of the most evenly-fed oxen ever seen, and both are admirable specimens of that *multum in parvo* capability (of packing a great deal of meat in a small compass) that so signally distinguishes the Devons. Mr. Heath supports his Lordship with another brace of very beautiful beasts, both highly commended; and then we come to a third, also highly commended. This turns out to be nothing more or less than the Gold Medal Smithfield Club ox of last Christmas, then the property of Mr. Heath, but now standing in the name of Mr. Passmore. So that this ox was fed for the meeting in December, then kept on for the Poissy Show in the spring, and now made up again for another Christmas! He is getting on for six years old, and has not improved in any way since last year. This is hardly an illustration of early maturity, but is more like keeping a plater to run on, as long as his legs will carry him. We did not notice that those of Mr. Potter's beast were failing him, so that most likely we shall meet him about for some seasons to come. By all means let young animals be kept on to show how they will develop; but really, re-feeding or fattening an animal over four or five years old sounds like an absurdity. The first prize Hereford steer, for example, a wonderful animal for his age, of great width and weight, should be kept on another year, as most probably he will be. By that time he promises to be quite as good a beast as that of Mr. Shaw.

The show of Herefords was right through, cows, heifers, and all, a very capital one. We seldom remember a better class of cows, and the first and second prizes, of very even merit, had all the fine points of the sort. When well-fed there is perhaps no so telling a looking beast as the Hereford. The very way in which they are marked gives them a favourable appearance. By-the-bye, is there such a thing as a *white* Hereford? There was one entered and shown as such, though we rather question whether, if he "claimed kindred here," he would "have that claim allowed."

The Society is, notwithstanding, very strict in its regulations on matters of purity. Some very good-looking Shorthorns, including the prize one of Lord Lichfield, had to be entered in the extra classes from the want of pedigree, or of some such proof of their descent. On the other hand, there were some leggy, patchy beasts in the classes proper, that in these times we should have scarcely thought worth sending. In fact, the Shorthorn oxen and steers were all below the mark; while the cows were as good as the others were bad. Of seventeen Shorthorn cows and heifers exhibited, sixteen had either premiums or commendations. The judges, to be sure, were very liberal in this respect, and commended occasionally where they had better, perhaps, have not left their sign. But this was not the case with the Shorthorn cows, all of which fairly merited the compliment. Indeed the cows were all good, the Devons being another excellent class, with the Prince Consort's heifer as the pick from amongst them. She is a most beautiful creature, and does equal credit to the Prince as her feeder, and to Mr. Hole, of Dunster, as her breeder.

The excellencies of the Longhorn are certainly not seen in a show-yard. The Highlanders and Welsh cattle—both famous eating—were short in entries, and no-ways so good as we have seen them; while the most interesting cross was one exhibited by his Grace the Duke of Beaufort, who seems fond of experiments. This was between a West Highlander and a Devon, in which some of the points of either were well preserved. It is satisfactory to see that the Longhorn is being fast crossed into a Shorthorn.

The sheep show at Birmingham is seldom, at least in point of numbers, a very great one. Two or three of our favourite sorts are generally in the hands of two or three as well-known breeders. As, for instance, Mr. Foljambe and Lord Exeter enter from their Leicester flocks, and Lord Walsingham from his Southdowns. This season Mr. Foljambe takes every premium awarded for the Longwools, and his Lordship is nearly as successful as he was last Christmas with his Downs. But within a very few years Lord Walsingham has made extraordinary progress with his sheep, and they have now quite a character of their own—beautiful heads, straight backs, and great width behind the shoulder. So generally good, indeed, are they, that it was again difficult to pick out the best of the lot, many going to a merely commended pen for him. The Cotswolds do not abound here, but their cross with the Southdown was seen to great advantage. People as yet have scarcely become familiar with its new title, but "the Oxfordshire Down" is a most useful-looking sheep, for almost anything you require of him. He has here, however, some especially formidable opposition to contend with. The sort of all others entered in anything like numerical force is the Shropshire Down, a variety coming fast into fashion, and that some think will soon be at the top of the tree. Still even the Shropshire Down does not stand quite on his own merits. The purest bred sheep of this kind in the yard were perhaps those of Lord Aylesford; and the best, once more, those of Mr. Smith of Sutton Maddock. The latter have a taste of the Southdown in them, imported from such men as Jonas Webb, Sainsbury, and Lugar. Both the first prize pens of Shropshire, those of Mr. Foster, as well Mr. Smith's, were of this improved character. Originally they claim to be a distinct breed of sheep; but now, like their cotemporaries, the Hampshire and Oxfordshire, they have to go to the thoroughbred Down as a refining medium.

The Midland Counties show of pigs is always a great one. The town and neighbourhood has a strong taste for the unclean animal; while such men as Messrs. Watson, Mangles, and Wiley generally give their support. As we have already intimated, the first-prize fat pig was Mr. Mangles' "Bendigo," the prize boar at Salisbury, and a most successful cross between the Yorkshire and Cumberland breeds. His portrait appears in the *Farmer's Magazine* for this month: not, of course, as a fat pig at Birmingham, but as a breeding one at Salisbury. The prize list will show that most of our best varieties were well represented. The run, however, was upon the Berkshires, of which Mr. Smith, of Henley-in-Arden, brought a pen of five unusually good young pigs. Two or three rather cautiously-worded certificates were handed in by the referees as to the ages of some of the pigs exhibited; although it seems scarcely possible that gentlemen of character should commit themselves in this wise.

An excellent show of roots admirably arranged, and as usual, a most attractive one of poultry, complete the chronicle. As we cannot find room for the awards in this latter department, we will allow, as far as is possible, the judges to tell their own story. In addition, then, to infinite commendations, they declared the golden pencilled Hamburgs, to be "a very good class"—the golden spangled Hamburgh to be "an extraordinarily good class"—the silver pencilled Hamburghs "a very good class"—and the same of the silver spangled. The Polish they passed without comment, but the Spanish were "excellent"—"meritorious and useful" and "unusually good." The coloured Dorkings "marvellous!" and the whites "improving." They deliberately pronounced the buff Cochins to be "*beautiful*" and the browns "excellent;" some of the game were also "excellent," and to the bantams they gave one "general high commendation." Of the game bantams they "could not speak too highly." The geese and Rouen ducks furnished "good classes," and the turkeys an "excellent one." We can only add to this, that there were pigeons of such fanciful tonsure and fashion as to utterly defy description. We can only hope such exquisites are never intended for pies. But still a layer of Mr. Towneley's famous cow, with two or three couples of prize Jacobins or Archangels over it, would be "a dainty dish to set before a queen."

We have often ere now had to speak to the good management displayed in Bingley Hall. If it were possible to improve on this, it has been done. Even on the best of the shilling days there was nothing like a crowd or a crush. Rarely was there a difficulty to see anything you wanted to—having when just as Mr. Davis had pitched his easel opposite a prize animal; or for the moment, as some right reverend enthusiast held forth on the many beauties of a bird he was anxious to buy—or to sell.

PRIZE LIST.

FAT CATTLE.

JUDGES:—Mr. Samuel Bloxsidge, Warwick.
Mr. John Tanner Davy, Ashtown House, South Molton, Devon.
Mr. Charles Stokes, Kingston, Kegworth, Derby.

HEREFORDS.

CLASS I.—OXEN OR STEERS.

First prize £10, with extra prize of £20 as best Hereford, and GOLD MEDAL as best of all the oxen, Mr. John Shaw, Hunsbury Hill, Northampton. Silver medal to breeder, Mr. Richard Shirley, Bawcott, Munslow, Shropshire.

Second, £5, Mr. William Heath, Ludham Hall, Norwich, Norfolk.

The Class generally commended.

CLASS II.—STEERS.

First prize, £10, and silver medal as breeder, Mr. John Naylor, Leighton Hall, Welshpool.

Second, £5, Mr. William Child, Wigmore Grange, Leintwardine, Herefordshire.

Commended, His Royal Highness the Prince Consort, Windsor Castle; the Earl of Aylesford, Packington, for two steers; and Mr. Joseph Phillips, Ardington, Wantage, Berkshire.

CLASS III.—COWS.

First prize, £10, and silver medal as breeder, Mr. Philip Turner, The Leen, Pembridge, Herefordshire (had three calves).

Second, £5, Mr. Edward Thomas, Colebatch, Bishop's Castle, Shropshire (had two calves).

The Class generally commended.

CLASS IV.—HEIFERS.

First prize £10, and silver medal to breeder, Mr. Henry Higgins, Woolaston Grange, near Lydney, Gloucestershire.

Second, £5, Mr. Samuel Walker Urwick, Leinthall Starks, Ludlow.

SHORTHORNS.

CLASS V.—OXEN OR STEERS.

First prize £10, and silver medal as breeder, Mr. William Eyton, Gonsal, Shrewsbury.

Second, £5, Mr. John Robinson, Leckby Palace, Topcliffe, Thirsk.

Commended, Mr. William Winterton, Wolvey Villa, Nuneaton; and Mr. Henry Roberts, Paxford, Blockley, Worcestershire.

CLASS VI.—STEERS.

First prize £10, and silver medal as breeder, Mr. Richard Stratton, Broad Hinton, Swindon.

Second, £5, Earl Spencer, Althorp, Northamptonshire.

CLASS VII.—COWS.

First prize £10, with extra prize £20 as best shorthorn, GOLD MEDAL as best of all the cows, and silver medal as breeder, Lieutenant-Colonel Charles Towneley, Towneley Park, Burnley, Lancashire (had one calf).

Second, £5, Mr. Robert Swinnerton, Weddington, Nuneaton (had one calf).

Highly commended, Viscount Hill, Hawkstone, Shropshire (had three calves), and Sir Thomas Whichcote, Bart., Aswarby Park, Falkingham, Lincolnshire (had one live calf and one dead).

The Class generally commended.

CLASS VIII.—HEIFERS.

First prize £10, and silver medal as breeder, Lord Feversham, Duncombe Park, Helmsley, Yorkshire.

Second, £5, Mr. Robert Gell, Grimston Hill, York.

Highly commended, Mr. Richard Thomas, Ryton, Dorrington.

Commended, Viscount Hill, and Mr. Joseph Phillips, Ardington, Wantage.

DEVONS.

CLASS IX.—OXEN OR STEERS.

First prize £10, with £20 extra prize as best Devon, Lord Ward's prize of £25 for best ox bred *and* fed by an exhibiter, and silver medal as breeder, Earl of Leicester, Holkham Hall, Norfolk.

Second, £5, The Earl of Leicester.

Highly commended, Mr. William Heath (for two oxen), and Mr. Joseph Potter, Witton, near Birmingham.

The Class generally commended.

CLASS X.—DEVON STEERS.

First prize £10, and silver medal as breeder, the Earl of Aylesford, Packington.

Second, £5, His Royal Highness the Prince Consort.

Commended, the Earl of Leicester, and Mr. Thomas White Fouracre, Durston, near Taunton.

CLASS XI.—COWS.

First prize, £10, Mr. John C. Halse, Molland, Devonshire; silver medal to breeder, Mr. Thomas Halse, Molland (had five calves).

Second, £5, Mr. William Heath, Ludham (had two calves).

Highly commended. Mr. Abraham Umbers, Weston Hall, Leamington (had six calves); and Mr. James Hole, Knowle House, Dunster, Somerset (had one calf).

CLASS XII.—HEIFERS.

First prize, £10, His Royal Highness the Prince Consort; silver medal to breeder, Mr. James Hole, Knowle House.

Second, £5, Mr. Thomas White Fouracre, Durston, near Taunton.

LONG-HORNS.

CLASS XIII.—OXEN OR STEERS.

Prize, £5, Mr. R. H. Chapman, Upton, near Nuneaton; silver medal to breeder, the late Mr. Samuel Burbery, Wroxhall, Warwick.

CLASS XIV.—COWS OR HEIFERS.

First prize, £10, Mr. Joseph Holland Burbery, Kenilworth; silver medal as breeder, the late Mr. Samuel Burbery (had one calf).

Second, £5, Mr. W. T. Cox, Spondon Hall, Derby (had three calves).

OTHER PURE BREEDS AND CROSS-BRED ANIMALS.

CLASS XV.—FAT OXEN OR STEERS.

First prize, £10, Mr. Richard Thomas Ryton, Dorrington, Shropshire; silver medal to breeder, Mr. J. K. Smith, Radbrook, near Shrewsbury (Short-horn, Hereford).

Second £5, Lieutenant-Colonel Towneley (Cross-bred).

CLASS XVI.—FAT COWS.

First prize, £10, Mr. Robert Swinnerton, Weddington, Nuneaton; silver medal to breeder, Mrs. Caroline Williams Bedworth, Nuneaton (Cross-bred—had one calf).

Second, £5, Mr. Richard Machin, Papplewick, Nottinghamshire (Long-horn and Short-horn cross—had one calf).

CLASS XVII.—FAT HEIFERS.

First prize £10, and silver medal as breeder, the Duke of Beaufort, Badminton, near Chippenham, Wilts (West Highland Scotch).

Second, £5, the Duke of Beaufort (a cross between a West Highland Scotch cow and a Devon bull.)

CLASS XVIII.—SCOTCH OXEN OR STEERS.

First prize, £10, Mr. Ralph Sneyd, Keel Hall, Staffordshire (West Highland).

Second, £5, Mr. Ralph Sneyd (West Highland).

WELSH BREEDS.

CLASS XIX.—OXEN OR STEERS.

First prize, £10, Mr. William Heath, Ludham.

Second, £5, Mr. Richard Doig, Surney Farm, Long Buckby, Daventry, Northamptonshire.

EXTRA CLASSES.

(For Animals not qualified to compete in any of the preceding Classes).

CLASS XX.—OXEN OR STEERS.

Prize £5, and silver medal as breeder, Viscount Dillon, Ditchley Park, Enstone, Oxfordshire.

CLASS XXI.—COWS OR HEIFERS.

Prize £5, Earl of Lichfield, Shugborough, (shorthorn, had one calf).

SHEEP.

JUDGES:—Mr. Edward Gough, Gravel Hill, Shrewsbury.
Mr. Joseph Holland Burbery, Kenilworth, Warwick.
Mr. John Moon, Hurstbourne Priors, Whitchurch, Hants.

CLASS XXII.—LEICESTERS.

(Fat Wethers, not exceeding twenty-two months old.)

First prize £10, extra prize £10 as best of all the Long-wools, and silver medal as breeder, Mr. George Saville Foljambe, Osberton Hall, Worksop, Notts.

Second, £5, Mr. Foljambe.

Highly Commended, Mr. John Hopper, Brompton, Pickering, Yorkshire.

CLASS XXIII.—LEICESTERS.

(Fat Wethers, exceeding twenty-two, but not exceeding thirty-four months old.)

No entry.

CLASS XXIV.—LONG-WOOLLED SHEEP, NOT BEING LEICESTERS.

(Fat Wethers, not exceeding twenty-two months old).

First prize £10, and silver medal as breeder, Mrs. West, Green Hill Farm, Bletchington, Oxfordshire (Cotswold).

Second, £5, Mrs. West.

Commended, Mr. William Hewer, Sevenhampton, Highworth, Wilts.

CLASS XXV.

(Fat Wethers, exceeding twenty-two, but not exceeding thirty-four months old).

No entry.

CLASS XXVI.—SOUTH AND OTHER DOWN SHEEP.

(Fat Wethers, not exceeding twenty-two months old).

First prize £10, and silver medal as breeder, Lord Walsingham, Merton Hall, Thetford, Norfolk.

Second, £5, Lord Walsingham.

CLASS XXVII.—SOUTH AND OTHER DOWN SHEEP.

(Fat Wethers, exceeding twenty-two, but not exceeding thirty-months old).

First prize £10, extra prize £10 as best of all the Short-wools, and silver medal as breeder, Lord Walsingham, Merton Hall, Thetford, Norfolk.

Second, £5, Sir Robert George Throckmorton, Bart., Buckland, Faringdon.

CLASS XXVIII.—SHROPSHIRE AND OTHER BLACK OR GREY-FACED SHORT-WOOLLED SHEEP.

(Fat Wethers, not exceeding twenty-two months old.)

First prize £10, and silver medal as breeder, Mr. Henry Smith, jun., Sutton Maddock, Shiffnal, Shropshire.

Second, £5, Mr. J. B. Green, Marlow, Leintwardine, Ludlow.

Highly Commended, Mr. Holland, M.P., Dambleton Hall, Evesham; Mr. William Orme Foster, M.P., Kinver-hill Farm, Stourbridge; and Mr. J. B. Green, Marlow (for another pen).

CLASS XXIX.—SHROPSHIRE AND OTHER BLACK OR GREY-FACED SHORT-WOOLLED SHEEP.

(Fat Wethers, exceeding twenty-two, but not exceeding thirty-four months old).

First prize £10, and silver medal as breeder, Mr. W. O. Foster, M.P.

Second, £5, Mr. T. C. Whitmore, Apley Park, Bridgnorth.

Highly commended, the Earl of Aylesford and Mr. H. Smith, jun., Sutton Maddock.

CLASS XXX.—CROSS-BRED SHEEP.

(Fat Wethers, not exceeding twenty-two months old.)

First prize, £10, silver medal as best cross-breds, and silver medal as breeder, Mr. Adam Corrie Keep, Wollaston, Wellingborough (South Down and Cotswold).

Second, £5, the Earl of Leicester (Down and Leicester).

Highly commended, the Earl of Leicester (Down and Leicester).

Commended, Mr. John Woolston,' Wellingborough (South Down and Cotswold); and Mr. John Bryan, Southleigh, near Witney, Oxfordshire (Cross-bred or Oxfordshire Down).

CLASS XXXI.—FAT WETHERS, EXCEEDING TWENTY-TWO, BUT NOT EXCEEDING THIRTY-FOUR MONTHS OLD.

First prize, £10, and silver medal as breeder, Mr. A. C. Keep, Wollaston, Wellingborough (South Down and Cotswold).

Second, £5, Mr. A. C. Keep, (South Down and Cotswold).

PIGS.

JUDGES:—Mr. Edward Gough, Gravel Hill, Shrewsbury.
Mr. Joseph Holland Burbery, Kenilworth, Warwickshire.
Mr. John Moon, Hurstbourne Priors, Whitchurch, Hants.

CLASS XXXII.—FAT PIGS.

(Fat Pigs of one litter, not exceeding ten months old.)

First prize, £10, and silver medal to breeder, Mr. T. R. B. Cartwright, Aynhoe, near Brackley, Northamptonshire.

Second, £5, Mr. Henry William Dashwood, Dunstew, near Woodstock, Oxfordshire.

CLASS XXXIII.—FAT PIGS.

(Fat Pigs of one litter, not exceeding fifteen months old.)

First prize, £10, and silver medal to breeder, Mr. Richard Benyon, Englefield House, Reading.

Second, £5, the Countess of Chesterfield, Bretby Hall, Burton-upon-Trent.

Highly commended, Lord Leigh, Stoneleigh Abbey, Kenilworth; and Mr. William James Sadler, Calcutt and Bentham, near Crickdale, Wilts.

Commended, His Royal Highness the Prince Consort; and Mr. G. B Morland, Chilton Farm, near Abingdon.

CLASS XXXIV.—FAT PIG.

(Exceeding Fifteen Months Old.)

First prize, £6, and silver medal as breeder, Mr. George Mangles, Givendale, Ripon, Yorkshire (Bendigo).

Second, £3, Mr. James John Whiteman, Brownsover, Warwickshire.

Highly commended, Mr. William Hemming, Coldicott, near Moreton-in-the-Marsh.

Commended, Mr. William Parkes, sen., Camp Hill, Birmingham, (for 2 pigs); Mr. Geo. Mangles, (for another pig); and Mr. Henry Thornley, Marston Hall, Birmingham.

CLASS XXXV.—PIGS OF A LARGE BREED.

(Five Pigs of one litter, exceeding three, and not exceeding six months old.)

First prize, £10, and silver medal as breeder, Mr Joseph Smith, Henley-in-Arden, Warwickshire (Berkshire).

Second, £5, Sir F. L. H. Goodricke, Bart., Studley Castle.

Silver medals to Mr. William Hewer, Sevenhampton, Highworth, Wilts (Berkshire); Mr. T. B. Wright, Great Barr, Staffordshire (Berkshire; Mr. Edward H. France, Ham Hill, near Worcester; Mr. Walter John Breach Scott, Queen's Hotel, Birmingham; and Mr. Henry Howell, The Firs, Green Lanes, Birmingham (Berkshire).

Highly commended, Mr. James Atty, Rugby; Mr. William Bradley Wainman, Carhead, Cross Hills, Yorkshire; Mr. Wm. Endall, Henley-in-Arden, Warwickshire (Improved Tamworth); and Mr. Robert Overbury, Henley-in-Arden, Warwickshire (Berkshire).

CLASS XXXVI.—PIGS OF A SMALL BREED.

(Five Pigs of one litter, exceeding three, and not exceeding six months old.)

First prize, £10, and silver medal as breeder, His Royal Highness the Prince Consort.

Second, £5, Mr. Samuel Wiley, Brandsby, York.

Silver medals to Colonel Pennant, Penrhyn Castle, Bangor, North Wales; Mr. Robert Harrison, Watson, Bolton Park, Wigton, Cumberland (2); Mr. Samuel Wiley; Mr. George Mangles; and Mr. George Garne, Churchill Heath, Chipping Norton.

Highly commended, Captain Robert Gunter, Wetherby Grange, Wetherby, Yorkshire; and His Royal Highness the Prince Consort.

The following Certificates were given in reference to the pens of Pigs disqualified:

"Birmingham, Nov. 28th, 1857.

"We hereby certify that one of the pigs in Pen No. 196 has a state of its dentition which indicates that the animal is about eleven months old.

(Signed) "JAMES B. SIMONDS.
"ROBERT L. HUNT."

"Birmingham, Nov. 28th, 1857.

"We hereby certify that the state of the dentition of the pigs, Pen No. 198, indicates that the animals exceed the ages named in the exhibitor's certificate.

(Signed) "JAMES B. SIMONDS.
"ROBERT L. HUNT."

"Birmingham, Nov. 28th, 1857.

"We hereby certify that the dentition of the pigs, Pen No. 239, shows that the animals are of greater age than represented in the exhibitor's certificate.

(Signed) "JAMES B. SIMONDS.
"ROBERT L. HUNT."

PRIZES FOR ROOTS.

JUDGE.—MR. J. MATTHEWS, Edgbaston House, Birmingham.

CLASS I.—A SILVER CUP VALUED TEN GUINEAS, OFFERED BY THE MAYOR OF BIRMINGHAM, FOR THE BEST COLLECTION OF THE FOUR FOLLOWING VARIETIES: LONG MANGOLD WURZEL, GLOBE MANGOLD WURZEL, SWEDES, AND CARROTS; SIX ROOTS OF EACH TO BE SHOWN.

Mr. Richard Benyon, Englefield House, Reading.

Highly commended, Mr. A. W. Johnson, Manor House, Gunnersbury, Ealing, Middlesex.

Commended, Mr. Robert Fellowes, Bitteswell Hall, Lutterworth; the Rev. Thomas Stevens, Bradfield Rectory, Reading; and Mr. J. B. Starkey, Spye Park, Chippenham.

CLASS II.—LONG MANGOLD WURZEL.

First prize, £2 2s., Mr. Charles Pratt, Stratford upon-Avon.

Second, £1 1s., Mr. A. H. Johnson, Manor House, Gunnersbury.

Highly commended, Mr. J. H. Horsburgh, Bradfield, Reading.

Commended, Mr. T. T. Stainton, Horsell, Woking, Surrey; Mr. Richard Benyon; and Mr. Saml. Robinson, Shaw House, Melbourne.

CLASS III.—GLOBE MANGOLD WURZEL.

First prize, £2 2s., Mr. J. H. Horsburgh, Bradfield, Reading.

Second, £1 1s., Mr. Richard Benyon.

Commended, Mr. A. H. Johnson (for two lots).

CLASS IV.—SWEDES OF ANY VARIETY.

First prize, £2 2s., Mr. Wm. Fletcher, Radmanthwaite, Mansfield.

Second, £1 1s., Mr. Robert Harrison Watson, Bolton Park, Wigton, Cumberland.

CLASS V.—COMMON TURNIPS.

First prize, £2 2s., Mr. Geo. Mangles, Givendale, Ripon, Yorkshire.

Second, £1 1s., Mr. Samuel Druce, jun., Abbey Farm, Eynsham, near Oxford.

CLASS VI.—CARROTS OF ANY VARIETY.

First prize, £2 2s., Mr. George Saville Foljambe.

Second, £1 1s., Mr. George M'Cann, Graham House, Malvern.

Highly commended, Mr. Wm. Lay, Place Farm, Chilton, near Abingdon.

Commended, Mr. George M. Kettle, Dallicott House, Bridgnorth.

CLASS VII.—OX CABBAGE.

First prize, £2 2s., Mr. Samuel Robinson, Shaw House, Melbourne.

Second, £1 1s., Mr. Robt. Fellows, Bitteswell Hall, Lutterworth.

CLASS VIII.—POTATOES.

First prize, £2 2s, Lord Leigh, Stoneleigh.

Second, £1 1s., Mr. James Howard, Tarleton, Chorley, Lancashire.

The JUDGES for POULTRY were:

Mr. George James Andrews, Dorchester.
Mr. John Baily, Mount-street, Grosvenor-square, London.
Mr. Thos. Challoner, Burnt Leys, Whitwell, near Worksop.
Mr. Edward Hewitt, Eden Cottage, Sparkbrook, near Birmingham.
The Rev. Robert Pulleine, the Rectory, Kirby Wiske, near Thirsk.

FOR PIGEONS.

Mr. T. J. Cottle, Pulteney-villa, Cheltenham.
Mr. Edward Hale, Handsworth.

REFEREE FOR THE AGES OF PIGS.

Professor Simonds, Royal Veterinary College, London.

VETERINARY INSPECTOR AND GENERAL REFEREE.

Mr. R. L. Hunt, Cannon-street, Birmingham.

The Birmingham exhibition has grown into such importance in nine years, that it deserves even an additional notice beyond that embraced in our regular report of the Meeting.

In the first place, what a magnificent building for the purpose is that Bingley-hall: with ample room and every convenience of arrangement, and even with elegance in the construction of the roof and the array of pillars, in the ornamentation and blazing chandeliers! And this year how comfortably have the enlarged numbers of stock and poultry been accommodated, by distributing the stalls of roots and seedsmen's specimens throughout various parts of the great area! Would that a similarly covered space existed in the metropolis! It would be most valuable and useful during other months than December. Cannot a site be found? where is the spirit to begin; and who will find the bricks and timber? Does the Smithfield Club answer best to a coaxing, or a roasting? Or is it quite bold enough to venture on such a spec. (after the example of young Birmingham) were it only a little more liberally fed with funds?

Look at the show in Bingley Hall: we had 36 classes of stock—including 135 entries of cattle, against 109 last year; 53 of sheep, against 46 last year; and 103 of pigs, against 101 last year. There were 8 classes of roots—comprising 130 entries, against 119 last year: 69 classes of fowls, ducks, geese, and turkeys, with 1,498 pens of birds, against 1,416 last year. Six hundred exhibitors this year—an increase of 46 over last time—contributed toward the excellence of the show; and while we had the presence of the very highest class of fat stock and unsurpassed poultry, it is remarkable that so many of the honours were carried off by new competitors, or else by those previously low in the scale: an evidence this of the extension of first-class breeding and feeding; while the old standard prizemen keep up their pace of improvement.

In examining the different classes, we did not forget how good the Herefords were last year; what a greatly improved, and indeed unsurpassed show of Devons we had; while the Shorthorns, as a whole, were not so grand as on some other occasions. Yet, as a testimony to individual merit in different breeds, it should be remembered that, while the Shorthorn gained the gold medal, the Hereford and Devon prize steers were also the judge's candidates for it. Last year one gold medal went to Mr. Stratton's Shorthorn ox, and the other to Mr. Pitt's Hereford heifer; and this time Mr. Shaw's Hereford ox and Colonel Towneley's Shorthorn cow are similarly victorious. But, beside these gold medals, singling out the best ox or steer and the best cow or heifer "of any breed or age" (that is, the best in the Show), just as at Baker-street, a competition is also established between animals of the same breed, but of course of different sex—"extra prizes" being awarded to the best Hereford, the best Shorthorn, and best Devon; that is, to the most meritorious animal in each breed, no matter whether it be aged or young ox, steer, cow, or heifer. And this year Lord Ward (the President) has given a piece of ornamental plate for the best ox or steer of any breed or age, "bred, as well as fed, by the exhibitor;" besides which, there is a sweepstakes in the Hereford, Shorthorn, and Devon classes for the breeders who are also the feeders and exhibitors. Would not some new honours of this kind be advisable in the next Smithfield Club prize sheet?

We shall not enter, in this place, into any criticism of the various classes; but what a magnificent cow is that of Colonel Towneley! her breadth and depth are wonderful! her back, chine, and rump splendid. How compact she is—how level! and what a rare touch she has! Her girth is 8 feet 6 inches; and Mr. Swinnerton's second-prize cow, one year and five months older, girths just the same. The small Devons took the palm away from the large animals, as witness the first-prize ox, which girths 7 feet 9 inches; while the second-prize one girths 8 feet 1 inch, having a much deeper chest and a larger frame.

It was gratifying to find the Shropshire Down sheep come up in such force. This breed is fast rising in fame, in spite of their alleged special liability to foot-halt. Originally descended from a hardy mountain breed, and inheriting an excellent constitution, they are not only enabled to thrive on exposed moorlands, but on better pastures evince an unsurpassed rapidity of growth and a tendency to a heavy weight at an early age. In frame and symmetry they have been so improved as to be noted for deep chests, famous legs of mutton, and fine dark-brown heads; while their wool is of the first-class for its thick pile and length of staple. And equally pleasing was it to see such a splendid show of cross-bred sheep; Mr. Keep's beautiful and indeed wonderfully-fed wethers proving the value of the cross between Cotswold and Southdown. It should be noticed that this breeder's first-prize older sheep competed closely with his shearlings for the silver medal, the latter taking the honour principally on account of their age.

We were glad to see that the veterinary inspectors were unflinching in the discharge of their duties in the pig classes. In one class we saw a pen of most beautiful pigs, which would undoubtedly have gained the prize had they not been disqualified because "the state of their dentition" indicated that their age exceeds that stated in the exhibitor's certificate.

It is impossible to estimate too highly the value of the Birmingham Poultry Show, standing, as it does, alone and above all others; for even at the Crystal Palace Show, it must be remembered that the birds are not exhibited in all the glory of their winter plumage, as they are here; and besides, this year's chickens have time to develope themselves before the show. Bingley Hall is the best possible guide for poultry keepers; as the fowls, are all classified, their points of excellence or demerit reduced to a system, and their individual deserts determined by the men who best understand them. And the public are not simply taught which are the most profitable breed for different districts or purposes; but they are instructed in the more minute characteristics of each variety and in all the abstruse excellencies of a perfect specimen, which make poultry-fancying almost a science. Thus, high condition, quality, beauty of plumage, purity of race, and uniformity in the markings, combs, and other characteristics of the fowls, are taken into consideration by the judges, in a greater degree than mere weight, without these distinctions. And the immense number of pens of almost perfect birds proves the extent to which these shows have spread the knowledge of good breeding and proper management. With a view of weeding-out inferior poultry, which might degrade the exhibition into a mere market, there is a rule forbidding any exhibitor showing more than four pens of fowls, ducks, geese, or turkeys, or six of pigeons; the subscription for entry is high; an extra charge is levied on each pen shown; and 10 per cent. is charged on every sale effected in the Hall. Yet there are more exhibitors than last year, and fully three pens a-piece were sent in; some apparently managing also to monopolize room by parcelling the ownerships of their ducks or chickens among the junior members of their family. Every part of the show was most satisfactory and successful; and we would also offer a word of praise to the admirable arrangement of matter in the bulky catalogue. In addition to the descriptive particulars of the animal, birds, and specimen of produce (and bear in mind that the details of the cultivation and manuring of each lot of roots is published for our instruction, as well as the sorts of food given to the live stock), there is a separate index for each of the two great divisions of the show. In the first you find not only the name and address of each exhibitor, but whether he shows cattle, sheep, pigs, or roots, and also the "number" attached to each of his animals. In the other list are the poultry and pigeon exhibitors, with similar convenient references. Here, again, might not our Smithfield Club managers follow with advantage a society which has in so many respects imitated them?

GLOUCESTERSHIRE AGRICULTURAL SOCIETY.

The third annual exhibition was held at Cirencester, on Thursday, November 26th, when the following prizes were awarded—

SHORT-HORNS AND OTHER BREEDS, EXCEPT HEREFORDS AND DEVONS.

For the best Bull above two years old, the gift of the Right Hon. Earl Ducie, £10, Mr. William Hewer, Sevenhampton, near Highworth.

Second best, £5, Mr. William Slatter, Stratton, near Cirencester.

Commended.—Mr. W. A. Elston, Bugbrook, Weedon.

For the best Bull above one and under two years old, £10, Mr. Richard Stratton, Broad Hinton, near Swindon.

Second best, the gift of W. P. Price, Esq., M.P., £5, Mr. J. W. Brown, Uffcott, near Swindon.

For the best Bull, Cow, and their Offspring, £10, Mr. Richard Stratton, Broad Hinton, near Swindon.

Second best, £5, J. H. Langston, Esq., M.P., Sarsden House, Chipping Norton.

For the best cow, in-calf or in-milk, £6, J. H. Langston, Esq., M.P., Sarsdon House, Chipping Norton.

Second-best, £3, Mr. Richard Stratton, Broad Hinton, Swindon.

For the best pair of heifers, in-calf or in-milk, under three years old, bred by the exhibiter, £10, Mr. Richard Stratton, Broad Hinton, Swindon.

Second-best, £5, Mr. John Lane, Cirencester.

Commended, Mr. Edward Bowly.

For the best pair of breeding heifers, under two years old, bred by the exhibiter, £8, the gift of Edward Holland, Esq., M.P., Mr. Edward Bowly, Siddington House, Cirencester.

Second best, £4, Mr. T. R. B. Cartwright, Aynho, near Brackley.

Highly commended.—Mr. John Lane, and Mr. R. Stratton.

HEREFORDS AND DEVONS.

For the best Bull above two years old, £10, the gift of the Right Hon. Earl Bathurst, Mr. John Walker Westfield House, Holmer, Hereford.

Second best, £5, Mr. James Ackers, Prinknash Park, Painswick.

Commended.—Mr. J. E. Lloyd Hewer, jun.

For the best Bull above one and under two years old, the gift of Sir C. W. Codrington, Bart., M.P., £10, Mr. J. E. Lloyd Hewer, jun., Vern House, Hereford.

Second best, £5, Mr. Wm. Taylor, Showle Court, Lower Eggleton, near Ledbury.

For the best bull, cow, and their offspring £10, the gift of the Right Hon. Earl Beauchamp, Mr. William Perry, Cholstrey, near Leominster.

Second best, £5, Mr. W. G. Bennett, North Cerney, Cirencester.

For the best cow, in-calf or in milk, £6, the gift of Robert Stayner Holford, Esq., M.P., Mr. Wm. Stedman, Bedstone Hall, Aston-on-Clun, Shrewsbury.

Second best, £3, Mr. J. E. Lloyd Hewer, jun., Vern House, Hereford.

For the best pair of heifers, in calf or in milk, under three years old, bred by the exhibitor, £10, the gift of Robert Stayner Holford, Esq., M.P., Mr. William Stedman, Bedstone Hall, Aston-on-Clun, Shrewsbury.

Second best, £5, Mr. Thomas Pope, Horningsham, Warminster.

The whole of this class commended.

For the best pair of Breeding Heifers under two years old, bred by the exhibitor, the gift of James Ackers, Esq., £8, Mr. William Perry, Cholstrey, near Leominster.

Second best, £4, Mr. Thomas Pope, Horningsham, Warminster.

Highly commended.—Mr. William Taylor.

FAT CATTLE.

For the best Fat Steer of any breed, the gift of the Hon. W. L. Bathurst, £6, Mr. Aaron Pike, Mitton, near Tewkesbury.

Second best, £4, Mr. Richard Stratton, Broad Hinton, near Swindon.

For the best fat cow, having had a calf at its full time, £6, Mr. Thomas Garne, Broadmore Farm, near Northleach.

Second best, £4, Mr. Aaron Pike, Mitton, Tewkesbury.

LONG WOOLS.

For the best five breeding ewes not more than 35 months old, £8, the gift of the Hon. Ashley Ponsonby, Mr. William Smith, Bibury.

Second best, £4, Mr. Thomas Beale Browne, Hampen, Andoversford.

For the best five breeding theaves, not more than twenty-three months old, £8, Mr. Wm. Smith, Bibury.

Second best, £4, to the Royal Agricultural College, Cirencester.

Commended.—Mr. Thomas Beale Browne.

For the best five Ewe Lambs not more than 11 months old, £5, Mr. James Newman, Calmsden, Cirencester.

SHORT WOOLS.

For the best five Breeding Ewes not more than 35 months old, the gift of the Right Hon. Earl of St. Germans, £5, His Grace the Duke of Beaufort.

Second best, £2 10s., Sir Robert G. Throckmorton, Bart., Buckland, Faringdon.

For the best five Breeding Theaves not more than 23 months old, £5, Sir Robert G. Throckmorton, Bart., Buckland, Faringdon.

Second best, £2 10s., Mr. Thomas Pope, Horningsham, Warminster.

CROSS BREED.

For the best five breeding theaves, not more than 23 months old, £5, Mr. William Hemming, Coldicott, near Moreton-in-Marsh.

Second best, £2 10s., Mr. John King Tombs, Langford, Lechlade.

FAT SHEEP.—LONG WOOL.

For the best three shearhogs not more than 23 months old, £5, to Mr. William Hewer, Sevenhampton, near Highworth.

Second best, £2 10s, to the Royal Agricultural College, Cirencester.

For the best five wether tegs not more than 11 months old, £5, Mr. James Newman, Calmsden, Cirencester.

For the best three fat ewes, £5, Mr. George Fletcher, Shipton, near Andoversford.

FAT SHEEP—SHORT WOOL.

For the best three shearhogs not more than 23 months old, £5, Mr. Edward Holland, M.P., Dumbleton Hall, near Evesham.

Class I.—FAT SHEEP—CROSS BREED.

For the best three shearhogs not more than 23 months old, £5, Mr. John Plumbe, Ashton Keynes, near Cirencester,

Second best, £2 10s., Mr. Charles Hobbs, Maisey Hampton, near Cirencester.

PIGS.

For the best boar pig under one year old, the gift of T. Gambier Parry, Esq., £4, Mr. Wm. Hewer, Sevenhampton, near Highworth.

Commended.—Mr. Edward Bowly.

For the best three sow pigs of the same litter under 4 months old, the gift of T. B. Lloyed, Esq., £4, Mr. J. H. Elwes, Colesbourne Park, Cirencester.

The whole of this class commended.

For the best sow pig for breeding purposes, the gift of J. H. Elwes, Esq., £3, Mr. Wm. Hewer, Sevenhampton, near Highworth.

For the best sow and pigs her own produce, the pigs under 10 weeks old, £3, Sir Robt. G. Throckmorton, Bart., Buckland, Faringdon.

HORSES.

For the best mare and foal (her own offspring) for agricultural purposes, £8, Mr. Henry Baily, Wallgaston, near Berkeley.

Second best, £4, Mr. Edward Holland, M.P., Dumbleton Hall, Evesham.

Commended—Mr. Samuel Bidmead.

For the best stallion, for agricultural purposes, above 2 years old, £10, Mr. William Edmonds, Wroughton, near Swindon.

For the best filly, for agricultural purposes, under 3 years old, the gift of Robert Gordon, Esq., £5, Mr. William Smith, Bibury.

Second best, £3, Earl of Radnor.

Commended—Mr. Richard Waine.

RUTLAND AGRICULTURAL MEETING.

Famous as the agriculturists of Rutland have been for the last 26 years for their exhibition of stock in the Riding House at Oakham, it is questionable whether a more splendid show of cattle of all kinds ever graced that building than took place at the anniversary on Wednesday, Dec. 2. It was acknowledged by many who have attended these gatherings for a number of years that a finer array of stock, both in regard to numbers and quality, was never seen in this county: so meritorious in every respect was the exhibition, that to say more in general praise would only detract from the excellence of what might be justly termed a "little Smithfield." If we may venture, however, to notice individual claims, the first-class steer shown by Mr. Wortley, of Ridlington, and which took the prize of 15 sovs., was generally acknowledged to be a fine specimen. Mr. Wortley was very successful this year, having taken four prizes in this department. The second prize ox shown by Mr. Lynn, of Stroxton, also attracted considerable notice. In class 2 the prize ox, 3 years and 9 months old, shown by the Marquis of Exeter, came in for its share of well-deserved admiration. It is intended to exhibit this beautiful animal at Leicester and Smithfield. Next in order stood (in class 3) a first-rate steer shown by R. W. Baker, Esq., of Cottesmore; this animal, although small, was perfect in every respect, and met with a very large share of commendation from practical men. A one-year-and-nine-months-old heifer, in extra stock, belonging to C. O. Eaton, Esq., was a first-rate animal, and obtained the silver medal given by the Duke of Rutland. There was a large show of sheep, and in these classes a spirited competition took place between Mr. C. J. Bradshaw, of Burley, and Mr. Wortley: the former, however, seems to have inherited the spirit of his father, who for a number of years figured so conspicuously and successfully in this department at Rutland and elsewhere. On the present occasion Mr. Bradshaw, jun., carried off four first prizes and one second prize; Mr. Wortley obtained second prizes in three classes. The most extraordinary specimen in the show was a Leicester ewe (bred by Mr. R. L. Bradshaw, and exhibited by his son), which competed for the silver medal offered by the tradesmen of Oakham; this animal was acknowledged to be the best ewe that has been seen at any of these shows: it will be entered for competition at Smithfield, and will, we think, be a match for any one of its kind that can be taken to the metropolis. In the same class was a ewe, 13 years and 8 months old, exhibited by Mr. T. Swingler, of Langham; this, considering its great age, was allowed to be a first-rate specimen. There was a large number of hunters for the premium given by the Marquis of Exeter, but nothing to call for particular notice was exhibited. The show of pigs was limited, but the animals were of a superior kind; one, a year and three months old, exhibited by R. W. Baker, Esq., as extra stock, was a perfect specimen of the porcine breed, and was highly commended. In the root-crop department the increase of prizes brought a corresponding increase in the number of competitors. Some first-rate turnips, mangolds, and cabbages, were shown outside the gates. The first prize in class 8 was awarded to the Hon. Col. Lowther; and Messrs. Painter, of Burley, carried off the silver cup given by the Hon. G. J. Noel, M.P., for swedish turnips in quantities of not less than ten acres.

During the morning a large number visited the Riding-house. A good sum was taken at the doors. Amongst the company we noticed Lord Aveland, Viscount Campden, the Hon. Col. Lowther and Miss Lowther, the Hon. G. J. Noel, M.P., the Hon. G. H. Heathcote, M.P., Geo. Finch, Esq., Gen. Fludyer, R. W. and W. H. Baker, Esqs., Jno. Eagleton, Esq., the Rev. H. Fludyer, Rev. Wm. Jackson, Rev. T. Davidson, &c., &c.

The Judges.

Stock.—Thomas Townsend, Esq., Ilmorton-hall, Warwickshire; Chas. Bosworth, Esq., Dishley, Leicestershire; R. B. Richardson, Esq., West Firsby, Lincolnshire.

Hunting Horses.—S. Hunt, Esq.; W. W. Tailby, Esq.; W. A. Pochin, Esq.

Vegetables.—Mr. R. Ward, Harringworth; Mr. J. Grimes, Pickworth; Mr. J. Linney, Thistleton.

AWARD OF PREMIUMS.

Oxen or steers, of any breed or weight, under five years of age. Open to all England. First prize, £15, to Mr. E. Wortley, of Ridlington; second, £7, to Mr. R. Lynn, of Stroxton; W. De Capell Brooke, Esq., and Mr. R. Jones commended.

Oxen or steers, of any breed or weight, under four years of age. First prize, £10, to the Most Noble the Marquis of Exeter, K.G.; second, £5, W. De Capell Brooke, Esq., of Geddington-grange.

Cows or heifers, of any breed, age, or weight. Open to all England. First prize, £10, to R. W. Baker, Esq., of Cottesmore; second, £5, to Mr. E. Wortley, of Ridlington; W. De Capell Brooke, Esq., and Sir Thos. Whichcote, Bart., commended.

To the owner, being a tenant farmer, of the best steer, under three years of age. First prize, £7, to Mr. Thos. Swingler, of Langham; second, £3, to Mr. E. Wortley, of Ridlington.

To the owner, being a tenant farmer, of the best steer, under two years of age. First prize, £5, to Mr. R. Lynn, of Stroxton; second, £3, to R. W. Baker, Esq., of Cottesmore.

To the owner, being a tenant farmer, of the best heifer, above two and under three years of age. First prize, £6, to Mr. C. J. Bradshaw, of Burley-on-the-Hill; second, £3, to Mr. T. W. Fowler, of Exton; Mr. E. Wortley and Mr. J. Woods commended.

To the owner, being a tenant farmer, of the best heifer, under two years of age. First prize, £4, to Mr. T. Chapman of Whitwell; second, £2, to Mr. E. Wortley, of Ridlington Mr. T. Swingler and Mr. J. Pears commended.

Offered by Stafford O'Brien, Esq.

To the owner, being a tenant farmer, of the best cow in milk, £5, to C. O. Eaton, Esq., of Kelthorpe; second, £2, to R. W. Baker, Esq., of Cottesmore.

To the exhibitor of the best bull, above two-and-a-half and under five years old, £5, to Mr. R. Lynn, of Stroxton; second, £3, to Mr. T. Suter, of Brook.

To the exhibitor of the best bull, above one and under two-and-a-half years old, £5, to the Right Hon. the Earl of Gainsborough; second, £3, to Mr. R. Lynn, of Stroxton.

To the exhibitor of the best mare, £3, to Mr. J. Hack, of Egleton.

To the exhibitor of the best yearling gelding or filly for agricultural purposes, £3, to Mr. W. Hammond, of Barrow.

Offered by the Right Hon. the Earl of Gainsborough.

(To the tenant occupier of not more than thirty acres of land in the district.)

To the owner of the best cow in milk, £5, to Mr. J. Williamson, of Langham; second, £2, to Mrs. J. Harris, of Langham; Mr. R. Mills, of Whitwell, commended.

To the owner of the best heifer, under two years and-a-half old, £4, to Mrs. J. Harris, of Langham; second, £2, to Mr. J. Edgson, of Langham; Mr. P. Healey, of Burley, commended.

To the owner of the best heifer calf, £2, to Mr. W. Hubbard, of Langham; second, £1, to Mrs. J. Harris, of Langham.

Offered by the Right Hon. Lord Aveland.

Long-woolled fat wether sheep, £10, to Mr. C. J. Bradshaw, of Burley-on-the-Hill; second, £5 (offered by the Society), to Mr. E. Wortley, of Ridlington.

Offered by the Society.

Long-woolled fat wether sheep, £7, to Mr. C. J. Bradshaw, of Burley-on-the-Hill; second, £4, to Mr. E. Wortley, of Ridlington.

To the owner of the best breeding ewes, £5, to Mr. C. J. Bradshaw, of Burley-on-the-Hill; second, £3, to Mr. T. Swingler, of Langham.

Long-woolled theaves, £4, to Mr. C. J. Bradshaw, of Burley-on-the-Hill; second, £2, to the Hon. Colonel Lowther, of Barleythorpe.

Long-woolled wether lambs, £3, to Mr. E. Wortley, of Ridlington; second, £2, to R. W. Baker, Esq., of Cottesmore.

To the owner of the best long-woolled ewe lambs, £3, to R. W. Baker, Esq., of Cottesmore; second, £2, to Mr. C. J. Bradshaw, of Burley-on-the Hill.

To the owner of the best pig of any breed, £4, to Mr. T. Bowles, of Great Hale; second, £3, to R. W. Baker, Esq., of Cottesmore.

To the owner of the best fat pig, £3, to Mr. T. Suter, of Brook; second, £1, to Mr. W. Beaskin, of Rearsby.

Offered by the Right Hon. the Earl of Gainsborough.

To the owner of the best fat pig, £2, to Mr. J. Stimson, of Egleton.

Offered by the Society.

To the owner of the best in-pigged or suckling sow or yelt, £2, to Mr. T. Rudkin, of Langham Lodge; the Right Hon. the Earl of Gainsborough commended.

Offered by the Most Hon. the Marquis of Exeter.

To the owner of the best half-bred four years old hunting mare or gelding, £10, to Mr. G. Tipping, sen., of Saltby; second (offered by gentlemen of the Cottesmore Hunt), £5 to Mr. P. Healey, of Manton.

Offered by his Grace the Duke of Rutland.

To the exhibitor of the best beast shown as extra stock, a silver medal, value £3, to C. O. Eaton, Esq., Tixover Hall; W. R. Morris, Esq., of North Luffenham, W. De Capell Brooke, Esq., of Geddington Grange, Mr. R. Lynn, of Stroxton, Mr. C. Chapman of Exton, commended.

Offered by the Tradesmen of Oakham.

To the exhibitor of the best sheep shown as extra stock, a silver medal, value £3, to Mr. J. C. Bradshaw, of Burley-on-the-Hill; Mr. R. L. Bradshaw, jun., Tinwell, Mr. R. Lynn, of Stroxton, Mr. T. Swingler, Langham, Mr. E. Wortley, of Ridlington, commended.

EXTRA STOCK.

R. W. Baker, Esq., of Cottesmore, a pig, one year and three weeks old, bred and fed by himself on wheat and barley meal, commended.

ROOTS AND VEGETABLES.

Offered by the Right Hon. Viscount Campden.

For Swedish turnips cultivated on any system, £7, to the Hon. Colonel Lowther, of Barleythorpe; second, £3, to Mr. W. Berridge, of Barrow.

Offered by the Hon. Gerard James Noel, M.P.

For the best specimen of Swedish turnips, a silver cup, value £10, to Messrs. J. and R. Painter, of Burley.

Offered by the Society.

For the best specimen of mangold wurtzel, £2, to Mr. T. Suter, of Brooke.

Offered by the Hon Roden Noel.

For best specimen of mangold wurtzel, £3 to Mr. T. Godfrey, of Glaston Lodge.

Offered by the Society.

For the best specimen of cabbage, £1, to W. Fabling, Esq., of Burley.

Offered by the Tradesmen of Oakham.

For the best specimen of white turnips, £7, to Mr. J. G. Bosworth, of Greetham.

Offered by R. W. Baker, Esq.

For the best specimens of ten Swedish turnips, mangold, wurtzel, and cabbages, 10s. each. Turnips, Messrs. Painter; mangolds, Mr. Fabling; and cabbages, Mr. Rudkin.

ENGLAND WILL NEVER BE FARMED AS IT OUGHT TO BE, UNTIL WE HAVE A TENANT-RIGHT BY LAW.

SIR,—The old adage says, "Out of evil cometh good;" and the case of Mr. Breedon Everard, of Groby Hall, Leicestershire, will open the ears and eyes of thousands of farmers in Great Britain, and cause them to *think* for *themselves*, and not to lay out their money so freely as Mr. Everard has done, upon the estates of others, without tenant-right, alias justice for unexhausted improvements made on the farm by the tenant. It is plain Mr. Everard has ruined himself by improving the estate of a noble lord, after which he is turned out by his lordship without stating any reason why, or allowing him compensation for the vast improvements made on the farm. In the *Mark Lane Express* of the 26th October, it was stated that Mr. Everard "had, in fact, in a space of five years, laid out £5,000 in improving a farm of something over 300 acres." The above treatment of the noble lord to his diligent and admirable tenant, in the great age of discovery and improvement is monstrous: such a feudal system must soon either be ended or mended. The tide of reason long delayed, long checked and obstructed, has neverthtless set in, in North Lincolnshire, in the shape of tenant-right, which is wise, just, reasonable and profitable, but more so to the landlord than the tenant. Lincoln Heath, and the Lincolnshire wolds, for instance—a century back, rabbit warrens and wildernesses the principal part of them—what do they produce now under tenant-right? Why great crops of corn, clover, and turnips, and some of the heaviest-woolled sheep in the kingdom. The great improvement of the said wild land under tenant-right is a fine example to all the world. I hope the Groby Hall case will be the means of causing a tenant-right to become the law of the land, to protect such useful and ornamental tenants as Mr. Everard. SAMUEL ARNSBY.

Peterborough, Nov. 5.

THE SMITHFIELD CLUB FAT CATTLE SHOW.

CATTLE.

As very erroneous impressions of the relative numerical strength of the different cattle classes, as compared with last year, may arise from mere inspection and recollection, we give the following figures, stating in the closest form which breeds have come up in unwonted force, and which of the new classes have contributed most to the increase of our present show. The entries were:

	1855.	1856.	1857.
Devons	17	21	32
Herefords	20	21	36
Shorthorns	40	42	43
Scotch, Irish, and Welsh	16	13	18
Other pure breeds	3	18	22
Cross-bred	7	12	8
Extra	9	13	17
Total	112	140	176

An increase, it appears, of one-third, both in the Hereford and Devon classes, has been the principal item in swelling the catalogue and filling the show-yard, though the Shorthorns still remain a long way ahead of the other breeds. The total number of cattle is very much greater than on any other occasion.

As to excellence, we have no hesitation in pronouncing this exhibition the best ever collected together in Baker-street Bazaar. Class after class presented an array of animals of remarkably high character, with rarely an inferior beast; and, as we might anticipate from the extension of good breeding of late years, the quality is almost universally of a superior description, and the huge monstrosities of fat once wondered at and ridiculed have given place to animals of a more profitably-feeding, early-fattening, and valuable kind. The standard of merit is not now simply the amount of flesh, except in the judgment of some old-school authorities; but the symmetry, quality, and valuable characteristics of the animal are taken into consideration, notwithstanding the circumstance of this Show being purposely designed for fat stock intended for the butcher. And we trust this principle will be persevered in—namely, to encourage such a fatness as may indicate the profitable nature of a breed, rather than mere weight, regardless of expense and time wasted in its attainment.

As to individual merit, we must own that, while the universal excellence proves how our various breeds are progressing, instead of deteriorating, the two best animals in the yard cannot be set up as nobler and more magnificent specimens than were ever seen before. If we were to compare the gold-medal ox or cow this year with those of many years back, we should undoubtedly find that a great advance has been made; but to expect that every year's prize animal is absolutely to eclipse the preceding one, is to consider breeding as purely mechanical. Whereas Nature bestows her gifts of form and beauty, and constitution and kindly habit, capriciously, as far as world-renowned marvels of excellence are concerned, and sometimes only at rare intervals gives us a Master Butterfly or a Durham Ox. Hence the relative merit of individual animals from one year to another is of less importance than the amount of improvement or otherwise marking an entire class, or, indeed, a whole show. And, of course, the larger the number of first-class animals bred, the greater the chance of obtaining an ox more perfect or astonishing than the world has yet seen. Now we do not at all detract from the merits of Mr. Wortley's gold-medal ox when we say that there have been other animals which are remembered as being grander in their day and generation. By affirming that the best ox once was better than the best is now, we are not implying the deterioration of all; because, now, the prize animal is not so far beyond all compeers as he used to be—or, at any rate, there is far greater merit in every beast in his class than was the case a very little time back.

The prize Shorthorn ox will remind many persons of the famous Durham ox, and is remotely descended, we hear, from Earl Spencer's celebrated stock. What an extraordinary length and breadth, and yet most beautiful symmetry and compactness of form; his chine and ribs most wonderfully expanded, his immense weight of flesh most evenly laid on, and of first-class quality; and his head and bone fine, and very handsome. The only deficiency appears in his thigh and twist, which might have been better in proportion. His measurement is extraordinary, the girth being no less than nine feet two inches, and the length nearly six feet. Now that Mr. Wortley has made such a glorious *debut* at Baker-street, winning golden opinions with his real golden honours, and also, in addition, a third prize for his Shorthorn cow, likewise of his own breeding, we hope to welcome him in future as an annually successful competitor.

Last year the Shorthorns were obliged to yield one of the gold medals to Mr. Heath's superb Devon; but the year before, they carried off both, just as on the present occasion. Colonel Towneley's splendid cow, four years and one month old, and having had one calf, is far before any other animal in her exceedingly good class, and is, indeed, one of the finest we ever saw; not, however, for an immense frame or an extravagant degree of over-fatness, but because of her level and regular feeding, her unsurpassed touch and quality of meat, united to a faultless symmetry, beauty, fine offal, and neat head. But the visitors to Salisbury, York, Birmingham, and elsewhere, know her so well that we need not extend our expression of admiration. We would only add, that if any proof were wanted of the importance of fat stock shows, it is here in the fact that an animal of the very purest and best breed has won the day against all others, in the production of the largest quantity of most valuable beef. But is she a *bona fide* fat animal for the butcher? Or will she be taken home, and, if possible, again used as a breeding cow? Colonel Towneley also gains a second prize for an exceedingly good steer in the cross or mixed-breed class; this steer and the cow being the only animals exhibited by him.

The show of Shorthorns, as a whole, was very satisfactory; and we particularly admired the class for steers or oxen above three years old, comprising some especially good animals, and the class of cows which contained some amazingly good and meritorious. Yet it will be observed in the list of awards that the judges have given the Shorthorns little more encouragement or approval than they were compelled to administer, only two commendations being accorded—one to Lord Southampton's ox, and the other to Mr. Garne's white cow The latter is very handsome, very fat, and had she been less patchy, and with more meat on her neck, would have been entitled to a prize.

In the steer class, Mr. Lynn's prise animal has a wonderfully good fore-quarter, but struck us as being defective about the first rib, and also on the hip. Earl Spencer's second-prize steer is a very good one; and Mr. Joseph Stratton's third-prize steer has great substance, though deficient in some points. Mr. Richard Stratton's steer in this class beat Earl Spencer's at Birmingham; but is certainly inferior in size and not superior in character. Mr. Brooke's second-prize ox and Mr. Roberts's third-prize ox are both useful and good beasts; the former, however, too patchy on the loin for our taste, and neither of them coming at all up to comparison with the magnificent Ridlington ox that has vanquished them. Mr. Cook's ox, five months older than Mr. Wortley's, is exceedingly large, and weighty, having great depth and length, but nothing like its breadth of chine and fore-quarter. Mr. Rushbrooke's is a very heavy good animal; as also that shown by Viscount Emlyn, and another shown by the Earl of Lonsdale. Mr. Barton's enormous beast is worth noting for his colossal frame; but very deficient in meat and quality.

In the heifer-class, Mr. Phillips's first-prize heifer is certainly the tallest and biggest; but considering that a first-prize female at any rate ought to be symmetrical, we do not like the chine or fore-quarter, though her hind-quarter is very good. Two other white heifers—one of the Earl of Radnor (taking the second prize), and the other bred and fed by Mr. Baker (which has been left without any recognition)—have occasioned considerable discussion as to the judges' award; the latter is very pretty and uniform in her proportions, and while not equal to the other in chine and neck-vein, rib and flank, is of greater size, and much better in loin, thigh and twist, and only three months older. Mr. Thomas's white heifer is very fleshy, having a wonderfully fat back; but we have here an evidence that mere adipose substance is not enough of itself to captivate the favour of the judges.

Sir Thomas Whichcote's second-prize cow is exceedingly level and handsome; her meat firm and good; but she is not well ribbed-up. Mr. Wortley's white third-prize cow is a beauty—splendidly fed.

A finer show of Herefords has never appeared at Baker-street, though their number is only three-fourths of that which we saw last week in Bingley Hall. Mr. Heath's prize steer has an immensely long frame, hip wide and well covered, tut and rump somewhat defective; altogether not so meritorious as the prize beast on some former occasions. His Royal Highness's second-prize steer is straight, deep, and heavy; but not particularly handsome. We consider Mr. Naylor's third-prize steer is of better quality; and has certainly a far better fore-quarter, though not so heavily fleshed, or so high and great. The oxen form an uncommonly good class, "generally commended" by the judges. Mr. Shaw's ox (which took the prize at Rugby, at Birmingham, and also here) is very extraordinary for his tremendous breadth, his good back and fore-quarter, and wonderfully fine head; he is very heavy, of splendid character and quality, perhaps his chief deficiency being in the flank. Mr. Heath's second-prize ox is of great length, very high standing, but not particularly good in girth. The Earl of Darnley's third-prize ox is exceedingly good; so are Mr. Ford's, Mr. Duffield's and Mr. Wright's "commended" oxen, the latter having almost a bison's depth of chest and bold fore-quarter. The heifers are a good class, Mr. Higgins' prize one being very fat and handsome, preposterous rump; Mr. Urwick's second-prize very symmetrical and compact, tut short, hips good; Mr. Thomas' perhaps too fat and lumpy.

The Hereford cows are extraordinarily good, and were all exhibited previously at Birmingham. Mr. Thomas, of Colebatch, and Mr. Thomas, of Ryton, both take prizes for uncommonly good animals. Mr. Naylor's third-prize cow is fat and of very fine quality, and Mr. Herbert's is also exceedingly good.

In the class of Devon steers we meet at once with a "bone of contention," namely the hip and rump, and other points, of His Royal Highness's second-prize steer, which, being somewhat narrow and defective, cause people to inquire how he could be selected for such an honour. His fine bone, handsome head, straight back, and nice quality of meat have been adjudged meritorious; for while the Earl of Leicester's third-prize steer has a wider fore-quarter, a better rump, thigh and twist, and good back, he has by no means that fashion about him that could make him more worthy of the second place than the other. Mr. John Overman's prize steer is a beauty; very perfect in form, a fine cylindrical frame, deep, with a full breast, and a handsome head. We also admired Mr. Fouracre's, for its size and substance. The Earl of Leicester's prize ox is very heavy, and well-fed, his girth extremely good, hind-quarters not so fine. Mr. Heath's second-prize ox has great girth, a splendid chine, but loin too lumpy, very firm in hand. Mr. Ball's third prize is a good animal; so is one shown by Mr. Fouracre, jun. His Royal Highness's is large, with a good back, beautiful breast, and most wonderful thigh and twist. Mr. Tucker's is a splendid ox; large, long, deep, symmetrical, and very weighty. The Devon heifers are an exceedingly good class. His Royal Highness's prize heifer is beautifully fed, her hips amazingly wide and good, good chine, but neck not thick enough in proportion. Mr. Farthing's second prize is very good, with a deep frame and short legs. We admired Mr. Heath's commended heifer; she is a little beauty, very fine indeed in quality. Mr. Farquharson's is extraordinarily good, particularly for her hind-quarters and rump. Mr. Coates's prize cow is very good in some points, having an especially good rump, but her first rib too much sinking-in. Mr. Bodley's second-prize cow is very handsome. Mr. Halse's third-prize cow, remarkable for her large tuts, was first at Birmingham, and at the Bath and West of England Show, and was also highly commended as a breeding cow at Chelmsford. The fact is, not only that cows are shown here which did not compete at Birmingham, but that the travelling and handling of that show greatly cut and spoil the quality of cattle exhibited here a week after, thus lessening their chance of prizes here, unless they be marvellously superior to all competitors.

The Sussex Cattle have come up well; they are better than ever: indeed, so meritorious that the whole class of steers or oxen is "generally commended." Mr. Cane's prize ox is very symmetrical indeed; of wonderful depth, and altogether a most valuable description of animal. Mr. Neame's second prize is handsome, and uncommonly good meat. We would mention, as particularly good, those shown by Mr. Botting, Mr. Shoosmith, and Mr. Jer. Smith; and among the heifers or cows, those of Mr. Tilden Smith, Mr. Neame, Mr. Cane, and Mr. Jer. Smith, are similarly worthy of great praise.

Of the Norfolk and Suffolk Polled Breeds, valuable both for fattening and for milking, we have only one in each of the two classes; but a larger show will doubtless appear next year. Lord Sondes and Mr. Badham are the successful exhibitors.

Of the Longhorns we have not much to say. Mr. Chapman's prize ox, which took the prize at Birmingham, of a light-red colour with a curly coat, is a good longhorn. Mr. Burbery's prize cow, which also obtained the prize at Birmingham, is of very good quality, though not in such good condition as she was there, and, as we were told, she would not eat "in this close place."

The Scotch Horned Steers or Oxen were "generally commended." Mr. Goodman's prize dun-coloured Highland is of considerable merit, of extraordinary depth and substance, and stands on short legs. Mr.

Duckworth's second-prize West Highland is also very good, and another of his black West Highlands is also an uncommonly good beast. Mrs. Delap's dun West Highland, bred by Lord Abinger, has very great size; but the ribs are flat, and the frame, therefore, too narrow. The Marquis of Downshire has also a good heifer in this class. The Duke of Beaufort's light-red West Highland heifer is very good in form, and of superior quality. Mr. Naylor's, though of great proportionate length, is low, small, and not straight enough to show much symmetry.

Of the only three Scotch Polled Oxen exhibited, Mr. Heath's and Mr. M'Combie's got prizes, and Mr. Oakley's Galloway was commended. Mr. Heath's is magnificent for the breed, which is the Aberdeen; having not only great length and depth, but widely-expanded chest and fore-quarters, ribs well arched, and uncommonly good hind-quarters and rump. This is the animal which was disqualified by the French Government at Poissy, because the Scotch exhibitors protested that he had been falsely entered as pure-bred, although (as they asserted) the breeder had declared to Mr. Heath that the bullock was a cross from a shorthorn and Scot. Mr. Heath was not suffered to explain or defend himself from such a gross charge; but, owing to the interference of Mr. Fisher Hobbs, who would not quietly see his countryman treated in so underhand and unfair a manner, the documents and evidences brought forward by these protestors were obtained. A correspondence took place between Mr. Heath, Mr. Longmore the breeder, and the gentlemen who had offered their testimony to the cross breed of the ox; and this has just been published in a pamphlet, from which it would appear that the Scotch gentlemen have either retracted or been shamed to silence; while Mr. Heath has been fully cleared of the calumnious accusation made against him. At the present show he has carried off the first prize for his bullock, the judges being thoroughly satisfied about the correctness of its breed.

No Irish beasts have arrived.

In the Welsh classes every one admired Colonel Pennant's ox, which gained the first prize, and also Mr. Williamson's second-prize younger beast. Mr. Heath's black and white Welsh ox is of extraordinary size, his depth and girth being great, and his back exceedingly good.

In the cross or mixed-breed classes, the Earl of Radnor takes the first prize for a very compact and well-fed Hereford and Shorthorn steer; Colonel Towneley the second prize; and Mr. Hare's Suffolk and Shorthorn poll is a valuable animal of nice quality. Mr. Thomas's Shorthorn and Hereford ox shows the possibility of making a pretty good beast by intermixing two breeds, each of which is perfect in its own way; but we cannot say we like the produce as much as the originals. The Duke of Beaufort's prize West Highland and Devon red heifer is an interesting and successful attempt to combine the valuable qualities of amazingly distinct breeds. She is a very compactly-formed, fine, and beautiful little thing.

We do not remember to have seen such a fine Extra Stock class before; and the judges have deservedly given it a "general commendation." The silver medal is adjudicated to his Royal Highness, for a very capital Devon steer; but other judges would be quite as likely to have awarded it in a different direction. In this class we find Lord Walsingham's Shorthorn heifer, which is fat, and uncommonly good; the Marquis of Exeter's white Shorthorn ox, which took the prize at Oakham last week; the Earl of Leicester's Devon ox, handsome, fine, beautifully fed, long, yet symmetrical, slightly defective about the hind-quarters; Sir Thomas Whichcote's shorthorn cow, level, deep-framed, and good; Mr. Brooke's enormously large Shorthorn ox; Lord Feversham's uncommonly fine, level, and beautiful Shorthorn heifer, remarkable for her wide hips and good rump of beef; Mr. Garne's good Shorthorn cow; Mr. Minton's very good and compact Shorthorn heifer; Mr. Williamson's large-horned Welsh ox, very meritorious indeed; and Mr. Pertwee's Hereford, which is a picture.

SHEEP.

There has been a considerable growth in the exhibition of good mutton, the number last year and this being as follows:

	1856.		1857.
Long-wools..........	40	..	35
Cross-breeds	18	..	32
Short-wools	38	..	62

Here we see at a glance that, while the Long-wools—or more properly the Leicesters—have slightly diminished in number, the crossbreeds and Southdowns, and other Short-wools have nearly doubled their entries in a single year. The great feature of the sheep-classes (just as at Birmingham) is the great advance made, and the size and superior quality attained, in a few years, by the crossbreeds, the long and short-wool half-breds being now some of the most profitable sheep we possess.

Class thirty-three includes some very great shearlings, as Mr. Hine's Leicester and Downs, and Mr. C. Howard's Oxfordshire Downs. It is a pity that the first prize sheep, good as they are, present the appearance of far wider backs to the eye than they actually reveal to the hand. Mr. Keep's second-prize Southdown and Cotswolds are very large, of great width and substance, thick necks, and have beautiful mutton and a good quantity of fair wool; their rumps rather defective. Mr. Hitchman's are good, and Mr. Stevens's have uncommonly good backs. Mr. John Overman's commended Southdown and Leicesters are very great, broad, and good; Mr. Edmonds's highly-commended Oxfordshire Downs not equally meritorious.

The next class — in which the sheep do not exceed 220lbs. live weight — is very good. Mr. Overman's prize Southdown and Leicesters are beauties, and their quality first-rate. Mr. C. Howard's second-prize Oxfordshire Downs are only slightly inferior; and the Earl of Leicester's, Mr. Hine's, and Mr. Twitchell's pens are all of exceeding good character.

The "Extra Stock" of crossbreds is a large class. Mr. Keep's extremely good Cotswold and Southdown wether gains the silver medal; Mr. John Overman's highly-commended Southdown and Leicester wether is very well formed, wide, and meritorious; Mr. Hine's Leicester and Down wether very handsome; Mr. Twitchell's, and the Earl of Leicester's, both deserving their commendations; and Mr. Hemming's Cotswold and Sussex Down wether is noticeable for its tremendous frame and proportions.

The short-woolled breeds are honoured with a gold medal, which has been fairly won by his Grace the Duke of Richmond, for a pen of Southdowns of his well-known character. The Earl of Radnor's Southdowns are very fine, meriting their second prize. Mr. Kent exhibits Downs of splendid form, which would have certainly gained a prize had they been more judiciously fed. The third prize is awarded to Mr. Rigden, and a high commendation to Lord Walsingham: but we do not concur in the decision here, his lordship's being much broader, better-formed, and handsomer than the others, and not far below them in quality. What a pity it is that exhibiters often leave so much to their shepherds! for were they to hand their sheep a little before sending off to the show, they would detect some two inches' thickness of wool on the shoulder and not one inch on the loin, which (we may inform them) has the effect of displaying an even, perfectly-shaped contour to superficial observers, and by concealing a defective form from the eye, winning a favourable first impression that often goes a long way with inexperienced judges. The class for sheep under 200lbs. live weight is remarkably meritorious, and therefore "generally commended." The Duke of Richmond's prize sheep are wonderfully handsome, and of superb quality; Mr. Marjoribank's highly commended are extremely good; Lord Walsingham's beautiful, and very good mutton; Mr. Rigden's small, but very pretty, and of nice quality; but we did not like the handling of Mr. Kent's second-prize sheep anything like so well as that of some others. The Earl of Radnor's prize older sheep are of great substance, and of the right form and quality; Lord Walsingham's second prize most excellent in shape, and longer and bigger than Mr. Kent's highly-commended beautiful wethers. The Duke of Richmond is also successful here in getting the third prize. In the class for short-wools, "not being Southdowns," the first-prize Hampshire Down wethers of Mr. Sharp have good backs; of very large size, said to weigh 24 stone each. Mr. Pain gets the second prize; but the pen is not a level lot, one sheep being a beauty, and the other two having defective loins and rumps; and we are of opinion that Mr. Canning's sheep—of great size and expansion, as well as handsome looks—ought to have had this prize instead of the third. Mr. Humphries' west-country Downs are highly-commended, doubtless for their beautiful form, great substance, and splendid backs. Mr. H. Smith's Shropshire Downs, which took the prize at Birmingham, do not handle so well here as they did there, but are of very good form, with capital rumps and good wool. The extra-stock short-wool class comprises a great many sheep. The wethers are extraordinarily good; and we need only mention as of first-class character and quality the Duke of Richmond's, which won the silver medal; Mr. Kent's, highly commended; the Earl of Radnor's, highly commended; Mr. Marjoribanks, highly commended; and Mr. W. King's, commended. Mr. Foljambe's silver-medal Southdown ewe is a beauty; Lord Walsingham's and Mr. Rigden's very good.

The gold medal for long-wools is taken by Lord Berners for by far the handsomest and best shearlings in these classes. The rest of the sheep in class thirty-one do not present any very remarkable points. In class thirty, Mr. Foljambe's prize wethers are remarkably good, very good frames, handsome backs, though rumps too short. Mr. Bradshaw's second-prize pen are open to a similar criticism. Mr. Hopper's are extremely good sheep, which were commended at Birmingham. In the class for Fat wethers not Leicesters, Mr. Hewer's prize Cotswolds are particularly good; and the second-prize Cotswolds of the Royal Agricultural College of Cirencester are of great size, but rather long in frame. Lord Berners gets the silver medal in the extra-stock class for long-woolled wethers; and the Marquis of Exeter also shows well here. In the extra-stock class for ewes, Mr. Bradshaw's Leicester ewe—a real beauty, and exceedingly good in back, plaits, rump, and fore-quarters—wins the silver medal.

PIGS.

This year we have four classes of pigs instead of three, in addition to one for extra stock, the alteration providing separate competition for animals of a younger age; and, except in the last class, all the stated ages are much earlier than was formerly the case. Last year there were 25 pens of three, and 13 single animals, or 38 entries altogether: this year there are 40 pens of three, and 19 single animals, making a total of 59; which is a very large increase in one year.

Pig-breeding and pig-feeding have simultaneously progressed at such a rapid rate, that we are every year more and more astonished at the earliness of maturity they manifest. It is really wonderful how so much meat can be accumulated upon the tender, unhardened frames of mere porcine "babes and sucklings." Mr. Morland's first prize white Chiltons are not 4 months old; and Mr. Baskcomb's second prize little beauties, of the white Kent breed, are only 15 weeks old. Mr. Druce's small black Oxfordshire pigs (highly commended) are only just 3 months old. In the class for "Pigs not exceeding 8 months old," Mr. Barber's prize Middlesex pigs deserve the highest praise. Sir J. B. Mills's second-prize white pigs are very fine in quality. We admired Sir John Cathcart's black ones (highly commended), and also Mr. Crisp's 6½ months old (black), which were sucking at Salisbury in July.

The next class, for "Pigs not exceeding 12 months old," is not particularly meritorious. Sir W. Booth's white Woodburys are good, and also the pen shown by Mr. Underwood and those of Mr. Marjoribanks; and there are three pretty good Neapolitan black pigs, exhibited by Lady Pigot.

The class for "Pigs not exceeding 18 months old" is "generally commended," being certainly very magnificent.

Mr. Morland's first-prize Improved Chiltons are very perfect in form, of splendid quality, very deep, and thick both in neck, chine, and hind-quarters. Mr. Betts's second prize Improved Suffolks are also particularly good. Mr. Tombs's highly-commended black Berkshire and Essex pigs are beauties; and Mr. Sadler's Berkshires, and the Rev. J. Holmes's Norfolk and Essex pigs are remarkably good in form and quality. His Royal Highness shows some excellent pigs in this class; and there is a pen of enormously fat ones, of a black breed, from the Parkhurst Prison Farm, in the Isle of Wight.

The Extra Stock single pigs form a famous class. The silver medal is awarded to Mr. W. Davey, jun., for No. 354—small black Leicester breed, very fat, and of most beautiful quality; in symmetry uncommonly well-formed. No. 349, shown by Mr. Barber, is highly commended, having a wonderfully fat neck. No. 351, shown by Mr. Hemming, is highly commended, and is certainly of extraordinary substance. Mr. Crisp's white Suffolk sow is also highly commended—a magnificent animal, of very great size, deep, wide, and beautifully proportioned; in quality also very fine.

Taken as a whole, we do not rank the show of pigs above the exhibitions of some former years, in respect to superbness of quality and high fattening; though there are certainly several very grand specimens to be found among the unprecedented number of pens entered on this occasion.

AWARD OF PRIZES.

FAT CATTLE.

JUDGES.

S. Anstey, Cornwall.
J. Buckley, Normanton Hill, Loughborough.
J. B. Thompson, Arnaby, Hull.

DEVONS.

Steers, not exceeding 3 years old.

First prize, £25—John Overman, Burnham Sutton, Burnham Market, Norfolk. Silver Medal to breeder, Mrs. Clark, Burnham Market. Purchased by Mr. Jeffery, Foubert's-place, Regent-street.

Second, £10—His Royal Highness the Prince Consort. Purchased by Mr. Jeffery.

Third, £5—The Earl of Leicester, Holkham, Norfolk. Purchased by Mr. Jeffery.

Steers or Oxen, above 3 years old.

First prize, £25, and Silver Medal as breeder—The Earl of Leicester. Purchased by Mr. Jeffery.

Second, £10—William Heath, Ludham Hall, Norwich. Purchased by Mr. Spencer, of Southampton.

Third, £5—Henry Hine Ball, Hankridge Farm, West Monkton, Taunton. Purchased by Mr. Harry Frampton, of Blandford, Dorset.

Heifers, not exceeding 4 years old.

First prize, £15—His Royal Highness the Prince Consort. Silver Medal to the breeder, James Hole, Knowle House, Dunster, Somerset. Purchased by Mr. Jeffery.

Second, £5—Walter Farthing, Stowey Court, Bridgwater. Purchased by Mr. J. W. Cowell, Colchester, Essex.

Cows, above 4 years old.

First prize, £20—John Coate, Hammoon, Blandford, Dorset. Silver medal to the breeder, Edward Boucher, Jews Farm, Wiveliscombe. Purchased by Mr. Clifton, Wimborne, Dorset.

Second, £10—John Bodley, Stockley Pomeroy, Crediton, Devon. Purchased by Mr. T. M. Smith, Westbury, Wilts.

Third, £5—John C. Halse, Molland, South Molton, Devon. Purchased by Mr. W. Stone, Holloway Road.

HEREFORDS.

Steers, not exceeding 3 years old.

First prize, £25—William Heath, Ludham. Silver Medal to the breeder, William Stedman, Bedstone Hall, Aston-on-Clunn, Salop.

Second, £10—His Royal Highness the Prince Consort. Purchased by George Reed, Burnham, Somerset.

Third, £5—John Naylor, Leighton Hall, Welsh Pool, Montgomery.

Steers or Oxen, above 3 years old.

First prize, £25—John Shaw, Hunsbury Hill, Northampton. Silver Medal to the breeder, Richard Shirley, Bancott, Shropshire. Purchased by George Gutheridge, High-street, Poplar.

Second, £10—William Heath, Ludham. Purchased by Mr. W. Pointing, Stroud, Gloucestershire.

Third, £5—The Earl of Darnley, Cobham Hall, Gravesend, Kent. Purchased by G. Freemantle, Upper Hill-street, Richmond, Surrey.

Commended—E. Wright, Halston, Oswestry; C. Duffield, Marcham, Abingdon; J. Ford, jun., Ruston, Blandford: and the class *generally commended.*

Heifers, not exceeding 4 years.

First prize, £15—Henry Higgins, Woolaston Grange, Lydney, Gloucester. Silver Medal to the breeder, William Raester, Withington Court, Hereford.

Second, £5—Samuel Walker Urwick, Linthall Starks, Ludlow.

Cows, above 4 years old.

First prize, £20, and Silver Medal as breeder—Edward Thomas, Colebatch, Bishop's Castle, Salop.

Second, £10—Richard Thomas, Ryton, Dorrington, Salop. Purchased by Mr. Tomline, 2, Queen-street, Pimlico.

Third, £25—John Naylor, Leighton. Purchased by Mr. G. Stanley, 10, Cambridge Road, Mile-End Gate.

SHORTHORNS.

Steers, not exceeding 3 years old.

First prize, £25, and Silver Medal as breeder—Robert Lynn, Stroxton, Grantham, Lincoln. Purchased by W. Bottrell, Rochester-row, Westminster.

Second, £10—Earl Spencer, Althorp, Northampton. Purchased by W. Lambert, Victoria-road, Pimlico.

Third, £5—Joseph Stratton, Manningford Bruce, Pewsey, Wilts. Purchased by Smith and Son, Salisbury.

Steers or Oxen, above 3 years old.

First prize, £25, Gold Medal as best steer or ox in any of the classes, and Silver Medal as breeder.—Edward Wortley, Ridlington, Uppingham, Rutland. Purchased by Messrs. Davis, Black Bull, New Cattle Market.

Second, £10—W. de Capell Brooke, Geddington Grange, Kettering. Purchased by W. Jones, Merthyr, Glamorganshire.

Third, £5—Henry Roberts, Paxford, Moreton-in-Marsh, Gloucester.

Commended—Lord Southampton, Whittlebury, Towcester.

Heifers, not exceeding 4 years old.

First prize, £15—Joseph Phillips, Ardington, Wantage, Berks. Silver Medal to the breeder, Richard Stratton, Broad Hinton, Swindon. Purchased by Thomas Collingwood, Abingdon, Berks.

Second, £5—Earl of Radnor, Coleshill House, Faringdon, Berks. Purchased by William Jones, Merthyr.

Cows, above 4 years old.

First prize, £20, Gold Medal as best cow or heifer in any of the classes, and Silver Medal as breeder—Lieut.-Col. Charles Towneley, Towneley, Burnley, Lancaster.

Second, £10 — Sir Thomas Whichcote, Bart.. Ashwarby Park, Falkingham, Lincoln.

Third, £5 — Edward Wortley, Ridlington, Purchased by Mr. Thomas Phelp, 10, Seymour-place, Camden Town.

Commended—T. Garne, Broadmoor, Nothleach.

SUSSEX.

Steers or Oxen of any age.

First prize, £20, and Silver Medal as breeder—Edward Cane, Berwick Court, Lewes. Purchased by Mr. Sharp, Brighton.

Second, £10—Charles Neame and Sons, Selling, Feversham, Kent. Purchased by Mr. Sharp.

The Class *generally commended.*

Heifers or Cows of any age.

First prize, £10, and Silver Medal as breeder—Tilden Smith, Beckley, Staplehurst, Sussex. Purchased by Mr. Spinger, Southampton.

Second, £5—Charles Neame and Sons, Selling, Feversham, Kent.

Commended—E. Cane, Berwick.

NORFOLK or SUFFOLK.

Polled Steers or Oxen of any age.

First prize, £10, and Silver Medal as breeder — Lord Sondes, Elmham Hall, Thetford, Norfolk. Purchased by Mr. G. Nicholson, North Elmham, Norfolk.

Polled Heifers or Cow, of any age.

First prize, £10, and Silver Medal as breeder—G. D. Badham, The Sparrow's Nest, Ipswich. Purchased by Mr. T. Richards, 8, Phœnix-street, Somers Town.

LONGHORNS.

Steers or Oxen, of any age.

First prize, £10—R. H. Chapman, Upton, Nuneaton, Warwick. Silver Medal to the breeder, the late Samuel Burbery, Wroxhall, Warwick. Purchased by Mr. Newbury, Southampton-street, Camberwell.

Heifers or Cows, of any age.

First prize, £10—Joseph Holland Burbery, of The Chase, Kenilworth, Warwick. Silver Medal to the breeder, the late Samuel Burbery, Wroxhall. Purchased by Mr. Newbury, Southampton-street, Camberwell.

Second, £5—John Jackson Burbery, Ibstock, Ashby-de-la-Zouch, Leicester. Purchased by Mr. Newbury.

SCOTCH-HORNED.

Steers or Oxen, of any age.

First prize, £20—Mr. Alexander Goodman, Willow Hall, Thorney, Cambridge. Purchased by Mr. Smith, King's-road, Chelsea.

Second, £10—Mr. Thomas Duckworth, Park Farm, Finchley, Middlesex. Purchased by Mr. James Horne, High-street, Camden Town.

The class *generally commended.*

Heifers or Cows, of any age.

First prize, £10, and Silver Medal as breeder—The Duke of Beaufort, Badmington, Chippenham, Wilts. Purchased by Mr. Thomas Pawsey, Bath.

Second, £5—Mr. John Naylor, Leighton. Purchased by Mr. H. Squire, Watford, Herts.

SCOTCH POLLED.

Steers or Oxen, of any age.

First prize, £20—Mr. William Heath, Ludham. Purchased by Mr. S. Mann, Croydon.

Second, £10—Mr. William McCombie, Tillyfour, Aberdeen. Purchased by Mr. Joseph Bannister, Windsor.

Commended—Mr. R. Oakley, Laurence End, Luton.

Heifers or Cows, of any age.

[No entry.]

IRISH.

Steers or Oxen, of any age.

[No entry.]

Heifers or Cows, of any age.

[No competition.].

WELSH.

Steers or Oxen (Runts), of any age.

First prize, £20—The Hon. Colonel Pennant, Penrhyn Castle, Bangor, Carnarvon—Silver Medal to the breeder, Mr. Richard Evans, Tal-y-braich, Bangor. Purchased by Hall and Son, Liverpool.

Second, £5—Mr. Isaac Williamson, Greenhill, Pembroke. Purchased by Mr. Petherbridge, Hastings-street, Brunswick-square.

The class *generally commended.*

Heifers or Cows, of any age.

The prize of £10—Mr. John Ewins Bennett, Bosworth Grange, Rugby. Purchased by Mr. G. Hatch, Croydon.

CROSS OR MIXED-BRED.

Steers, not exceeding 3 years old.

First prize, £15, and Silver Medal as breeder—The Earl of Radnor, Coleshill House, Faringdon. Purchased by Mr. Field Waghorn, Cheltenham.

Second, £10—Lieutenant-Colonel Charles Towneley. Purchased by Miss Abbott, Wimborne.

Steers or Oxen, above 3 years old.

First prize, £15—Mr. Richard Thomas, Ryton, Dorrington, Salop—Silver Medal to breeder, Mr. J. K. Smith, Radbrook, Shrewsbury.

Second, £5 — Henry Bone, Avon Farm, Ringwood, Southampton. Purchased by Mr. John Ridout, Poole, Dorset.

Heifers, not exceeding 4 years old.

The prize of £10, and Silver Medal as breeder—The Duke of Beaufort. Purchased by Mr. Thomas Pawsey, Bath.

SHEEP.

Judges.

S. Anstey, Cornwall.
J. Buckley, Normanton Hill, Loughborough.
J. B. Thompson, Arnsby, Hull.

Fat Wether Sheep, of any Long-woolled breed, 1 year old (under 22 months.)

First prize, £20, and Silver Medal as breeder—Mr. G. S. Foljambe, Osberton Hall, Worksop, Notts. Purchased by Mr. Newbury, Southampton-street, Camberwell.

Second, £15—Mr. C. J. Bradshaw, Alstoe House, Burley-on-the-Hill, Oakham, Rutland. Purchased by Mr. Wm. Hawkins, 6, Johnson-place, Harrow-road.

Third, £5—Mr. John Hopper, Brompton Green, Pickering, York. Purchased by Mr. E. Bassett, Crown-court, St. James's.

Fat Wether Sheep, of any long-woolled breed, 1 year old (under 22 months), each sheep not to exceed 220lbs. live weight.

First prize, £20, Gold Medal as best long-woolled sheep in any of the classes, and Silver Medal as breeder—Lord Berners, Keythorpe Hall, Leicester. Purchased by Alfred Gorton, Great Windmill-street, Haymarket.

Second prize, £15—Richard Newman, Harrowden, Bedford. Purchased by Mr. J. Parfitt, Old Manor-road, Stepney.

Third prize, £5—G. S. Foljambe, Osberton.

Fat Wether Sheep, of any long-woolled breed not Leicesters, 1 year old (under 22 months).

First prize, £15, and Silver Medal as breeder—William Hewer, Sevenhampton, Highworth, Wilts. Purchased by Mr. Samuel Bridge, Manor-street, Chelsea.

Second prize, £10—The Royal Agricultural College, Cirencester. Purchased by Mr. Rebble, Chapel-street, Edgeware-road.

Third prize, £5—*no competition.*

Judges for cross-bred and short-woolled sheep—

J. Clayden, Littlebury, Saffron Walden.
H. Lugar, Hengrave, Bury St. Edmunds.
E. Pope, Great Toller, Dorset.

Long and Short-woolled Cross-bred Fat Wether Sheep, 1 year old (under 22 months).

First prize, £15, and Silver Medal as breeder—George Hine, jun., Oakley, Bedford. Purchased by Mr. Spinger, Southampton.

Second prize, £10—Adam Corrie Keep, Wollaston, Wellingborough. Purchased by Mr. Worley, Kensington.

Third prize, £5—Charles Howard, Biddenham, Bedford. Purchased by Mr. S. Knight, Union-street, Clarendon-square, Somerstown.

Highly commended—E. Edmonds, Longworth, Faringdon.

Commended—J. Overman, Burnham Sutton.

Long and Short-woolled Cross-bred Fat Wether Sheep, 1 year old (under 22 months), each sheep not to exceed 220lbs. live weight.

First prize, £10, and Silver Medal as breeder—John Overman, Burnham Sutton. Purchased by Mr. Sacks, Crawford-street, Marylebone.

Second prize, £5— Charles Howard, Biddenham. Purchased by John Stevens, Oxford.

Highly commended—The Earl of Leicester.

Commended—G. Hine, jun., Oakley.

Fat Wether Sheep, of any short-woolled breed, 1 year old (under 22 months).

First prize, £20, Gold Medal as best short-woolled sheep, and Silver Medal as breeder—The Duke of Richmond, Goodwood, Chichester. Purchased by Mr. King, Paddington-street.

Second prize, £10—The Earl of Radnor, Coleshill House, Faringdon. Purchased by Mr. Stimpson, Wandsworth.

Third prize, £5—William Rigden, Hove, Brighton. Purchased by Mr. Davey, Brighton.

Highly commended—Lord Walsingham, Merton, Thetford.

Fat Wether Sheep, of any short-woolled breed, 1 year old (under 22 months), each sheep not to exceed 200lbs. live weight.

First prize, £10, and Silver Medal as breeder—The Duke of Richmond. Purchased by Mr. King, Paddington-street.

Second prize, £5—John Kent, Goodwood, Chichester. Purchased by John Stevens, Oxford.

Highly commended—S. Marjoribanks, Bushey Grove, Watford.

Commended—Lord Chichester, Stanmer, Lewes; and the class *generally commended.*

Fat Wether Sheep, of any short-woolled breed, 2 years old (above 22 and under 34 months).

First prize, £20, and Silver Medal as breeder—The Earl of Radnor, Coleshill. Purchased by W. Jeffery, Foubert's-place.

Second prize, £10—Lord Walsingham, Merton Hall, Thetford. Purchased by W. Jeffery.

Third prize, £5—The Duke of Richmond. Purchased by W. King, Paddington-street.

Highly commended—J. Kent, Goodwood.

Commended—W. Rigden, Hove.

Fat Wether Sheep, of any short-woolled breed not South Downs, 1 year old (under 22 months).

First prize, £15—James Sharp, Remenham, Henley on Thames; Silver Medal to the breeder, John Piggott, Harrow Farm, Froxfield, Hungerford. Purchased by W. Jeffery.

Second prize, £10—J. T. F. Pain, North Houghton Manor, Stockbridge. Purchased by Alfred Gorton, Great Windmill-street, Regent-street.

Third prize, £5—William B. Canning, Chisleden, Swindon, Wilts. Purchased by W. Bottrill, Rochester-row, Westminster.

Highly commended—W. Humphrey, Oak Ash, Wantage.

Commended—W. King, New Hayward, Hungerford.

PIGS.

JUDGES.

J. CLAYDEN, Littlebury, Saffron Walden.
H. LUGAR, Hengrave, Bury St. Edmunds.
E. POPE, Great Toller, Dorset.

PIGS of any breed, not exceeding 4 months old.

First prize, £10, and Gold and Silver Medals as breeder—George B. Morland, Chilton Farm, Abingdon, Berks. Purchased by John Lewes, Bristol.

Second, £5—George Henry Bascomb, Manor House, Chislehurst, Kent. Purchased by Mr. Ketteman, King-street, Bow.

Highly commended—S. Druce, Eynsham, Oxon.

PIGS of any breed, above 4 and not exceeding 8 months old.

First prize, £10, and Silver Medal as breeder—William Mills Barber, Sunninghill Wells, Berks.

Second, £5—Sir J. B. Mill, Bart., Mottisfont Abbey, Romsey, Southampton. Purchased by Mr. Benny, Camberwell Gate.

Highly commended—Sir J. A. Cathcart, Cooper's Hill, Chertsey.

Commended—T. Crisp, Butley, Woodbridge.

PIGS of any breed, above 8 and not exceeding 12 months old.

First prize, £10—Sir Williamson Booth, Bart, Woodbury Hall, St. Neots. Purchased by Mr. G. Glock, Broadway, Deptford.

Highly commended—G. Underwood, Ashbridge, Berkhampsted.

Commended—S. Marjoribanks, Bushey Grove.

PIGS of any breed, above 12 and under 18 months old.

First prize, £10, and Silver Medal as breeder—George B. Morland, Chilton. Purchased by Mr. Tinkler, Knightsbridge.

Second, £5—Edward Ladd Betts, Preston Hall, Maidstone. Purchased by Mr. John Lewes, Bristol.

Highly commended—J. K. Tombs, Langford, Lechlade.

The class *generally commended.*

EXTRA STOCK.

Silver Medal, for the best Beast in extra stock—His Royal Highness the Prince Consort (Devon Steer). Purchased by Messrs. Comfort and Son, 77, Farringdon-street, City.

Silver Medal, for the best Long-woolled Wether Sheep in extra stock—Lord Berners. Purchased by Alfred Gorton, Great Windmill-street, Haymarket.

Silver Medal, for the best Long-woolled Ewe in extra stock—Mr. C. J. Bradshaw, Alstoe, Burley-on-the-Hill. Purchased by Mr. Ford, Kenton-street, Brunswick-square.

Silver Medal, for the best Cross-bred Sheep in extra stock—Mr. Adam Corrie Keep, Wollaston, Wellingborough (Southdown and Cotswold).

Silver Medal, for the best Short-woolled Wether Sheep in extra stock—The Duke of Richmond. Purchased by Mr. King, Paddington-street.

Silver Medal, for the best Short-woolled Ewe in extra stock—Mr. G. S. Foljambe. Purchased by Mr. Turpen, Barking, Essex.

Silver Medal, for the best Pig in extra stock—Mr. William Davey, jun. (Leicester.)

The Cattle in extra stock *generally commended.*

In extra-stock Sheep, *highly commended*—Mr. J. Overman, Burnham (Southdown and Leicester), Mr. J. Kent (Southdown), Mr. S. Marjoribanks (Southdown), Lord Radnor (Southdown), and Lord Walsingham (Southdown).

In extra-stock Sheep, *commended*—Lord Leicester (Leicester and Southdown), Mr. J. B. Twitchell, Wilby (Down Cotswold and Leicester), Mr. W. King (West-country Down), and Mr. W. Rigden (Southdown).

In extra-stock Pigs, *highly commended*—Mr. W. Mills Barber, Sunning-hill (Improved Middlesex), Mr. W. Hemming, Coldicott, Moreton-in-Marsh (Improved Coldicott), and T. Crisp, Butley (Suffolk).

EXHIBITION OF IMPLEMENTS, ROOTS, &c.

We will certainly try to give some report of this exhibition, but the crowded state of the galleries containing the specimens exhibited forbids any approach to accuracy in detail; and much as we should like to oblige our many exhibitors by an extended notice of their interesting collection of implements, machinery, articles of dairy and domestic use, and the various root, seed, and other stalls, we find it is utterly impossible to do so with any satisfaction to ourselves or to them. If want of space characterizes the cattle show below, how much more is it felt above! There valuable implements are packed one above another, and others are never seen at all. We inquired for Bentall's well-known scarifier, and, large as it is, it was hidden amongst the surrounding implements. This department of the Smithfield Club Show is now becoming a most important feature; the immense offshoot is fast outgrowing the stupendous tree, and must be provided for. We are well aware that the implement show is independent of the Smithfield Club, and forms no part of their operations; but as it has now become in *real fact* a prominent part of the show, the public look to the Club to make provision for suitable accommodation. Last year the charge for space was one guinea for every 4ft. 6in. frontage; this year the same charge is made for 2ft. 9in. frontage. We were told that one of our leading firms paid from £33 to £37 for standing, another a similar sum, another £22, and so on according to the engaged space. We do not know the area of these galleries, but they contain about 100 exhibitors, few of whom pay less than from two to ten guineas each. We never heard a complaint so general of bad accommodation, for which they paid so dearly. The proprietor has done what he could to divide his space between the applicants; but not having enough, the consequence is that the implements and machinery are imperfectly shown, they thus obtain a doubtful reputation, and dissatisfaction is the result. We commend the subject to the Smithfield Club. Something must be done. The proprietor must be induced to enlarge his space by adding more upper galleries, and the steam-engines below must give place to the stock. We admire the general arrangements made by Mr. Boulnois for the accommodation of all parties, and we think the site of the show-yard very desirable; but as the thing continues to grow, the space will not suffice, and it will ultimately be for the Club to provide for its increasing exhibitors. We think the neighbourhood of the Metropolitan Market could point out a good place. We have now every convenience of rail and other modes of transit. It may not be visited by so many of the London citizens as a *show place;* but the attendance of agriculturists would be larger, as it would undoubtedly then include the Great Metropolitan Market-day, when great numbers from every part of the kingdom attend. It is precisely at this period of the year when a national implement show is of most value: the various operations of thrashing, chaff cutting, cake-breaking, root-steaming, &c., are now going on, and farmers are not always so provident as to provide these things in the summer for the requirements of the winter. We urge these matters upon the favourable attention of the Club.

We will now elbow our way through the rows of machinery. The usual place below-stairs was appropriated to the exhibition of steam-engines and thrashing-machines, but so pressed have the club been for room, that they could not allow any firm to show both an engine and machine; so that Messrs. Garrett and Sons, Clayton and Shuttleworth, Barrett and Exall, Tuxford and Sons, Ransomes and Sims, Oliver Maggs, and Hayward (of Derby) exhibited their well-known portable engines; whilst Hornsby and Sons, Wedlake and Dendy, Humphries, Roby and Scott, Foord (of Lenham), and Smith and Co. preferred showing their combined thrashing and dressing or finishing machines. Holmes and Son (Norwich) had also their cloverseed-drawing machine; and Heywood's two-and-a-half-horse engine, with vertical cylinder and novel method of working the slide, is well worthy the attention of the farmer.

[We now ascend the stairs with the crowd, for the short time permitted for the private view does not suffice to allow us to obtain even a cursory look at the implements. This might be obviated another year without interfering with the stock judges. We commend this to the stewards.]

We make our way to No. 1, the stall of our indefatigable Director, or rather the firm with which he stands connected. They exhibit a splendid collection of roots—globe mangolds in abundance, weighing from 20 to 31½lbs. each; carrots, reds and whites; exceedingly good long red mangolds, very fine specimens; capital swedes, Mr. Rose's variety standing prominent; many beautiful specimens of turnips in great variety. Many of the roots have the names of the growers ticketed upon them; amongst whom we observed his Royal Highness the Prince Consort, the Duke of Bedford, Mr. W. F. Hobbs, Mr. Powells, Mr. Druce, Mr. Williams, Mr. Fryer, Mr. W. E. Williams, Rev. R. T. Forrester, Mr. J. Arkwright, Mr. J. B. Twitchell, Mr. B. Crawshay, Mr. F. Strickland, and the Parkhurst Prison Spade Husbandry. The stall was beautifully ornamented with specimens of seeds and grasses, &c.

The next stand is Mr. BUSBY's, of Bedale, York, who exhibits his very useful prize carts and ploughs, Woofe's patent paring-plough, and horse-hoes.

WEDLAKE sent a two-horse and a three-horse steam machine of very useful character. These small machines and engines appear to make way; we have this year several exhibitors of them.

Messrs. GARRETT and SONS have the next stand, and display their usual admirable selection from their manufactory. Their horse-hoe has a new and novel appliance for elevating and depressing the hoes in work, consisting of a movement made by a right and left-handed screw, which, as turned by a crank, will lower or elevate the hoes as required. To names so well known as improvers in agricultural mechanics we need not add our word of approval.

Messrs. GEO. GIBBS and Co. show a stall of unusual interest: cabbages weighing 30lbs., gourd 125lbs., grown by Messrs. Thraill; Skirving's swedes, very large; stubble or River's swede, grown since 1st of August; these and the yellow mangolds, very fine.

BIGGS' dipping apparatus comes next. The sheep in trough looks natural, and attractive enough to the casual visitor.

CLAYTON and SHUTTLEWORTH are exhibitors of their excellent machinery. The chief thing we would notice in connection with this firm is their general reduction in prices of their engines and thrashing-machines, drying from five to fifteen per cent., as good as ever.

CLAYTON (HENRY) brings a very interesting model of a cottage built with his improved bricks, tubular and perforated. The cottage model is exceedingly good, and consists of a double cottage under a large, expanding roof, the one cottage being behind the other: a small portico entrance, living room to the right, boys' bed-room to the left, stairs in front of door; the upper floor consists of parents' bed-room and girls' bed-room, with closets, &c.; the living-room 11 feet 4 inches by 9 feet 4 inches, other details in proportion; the price of double cottage, £150. They have brought out also a hand-machine for brick-making, and a small two-horse pugging and brick machine; their machines for brick-making are so well known, that it is almost superfluous to enumerate them.

JNO. WARNER and SONS have a stand of their celebrated pumps for field service and the fold-yard; root-cutters and graters. Their irrigating pump may become a valuable acquisition in farm management.

T. LLOYD and SONS enter their superior flour and corn crushing mills. These flour mills divide the meal into five parts. We found Ball's ovens here.

SUTTON and SONS have a splendid show of roots. Globe yellow mangolds, very large: one grown on the Prince Consort's farm weighed 29lbs.; another by Earl Radnor 31½lbs., which took the prize at Cirencester; a long white mangold weighed 42lbs., another 40lbs.; some large long reds by Mr. Benyon. Turnips and other roots in splendid variety.

JAS. and FRED. HOWARD exhibit their famed ploughs, horse-rakes, &c. They have effected an improvement in strengthening their plough-beams by manufacturing them of "ribbed or T iron," taking care to give additional strength at the point of draught. When this is done, the weight of the plough is not so heavy by 6lbs. The coulter-stalk is oval. The management of wheel fastenings is new and commendable.

BURGESS and KEY have an interesting exhibition, attracting much attention, their prize reaper ranking first: the conical screw, aiding so admirably the side-delivery, was much noticed. The machine looks somewhat large and massive, but we have the result of the trials at Boxted Lodge showing the draught before us, which we have pleasure in giving. It is as follows:

Messrs. Burgess and Keys's.	2¾ cwt.,	cutting 5 ft. 4 in.
Messrs. Crosskill's Bell	4 cwt.,	cutting 5 ft. 4 in.
Messrs. Dray and Co.'s	3 cwt.,	cutting 4 ft. 4 in.

Their rotary pump is a novelty worth close examination: it is a peculiar way of raising water, the continuous turning of the crank causing a constant flow of water through the vulcanized india-rubber pipe; it is effected by pressure creating the vacuum.

DRAY and Co. have a first-class collection, including their prize reaper, which created such interest at Waterford. Their other implements fully sustained their acknowledged reputation as first-class mechanics as well as agents. Their portable forge is a simple and useful appendage in a farm-yard.

Messrs. PRIEST and WOOLNOUGH attract us with their first-class horse-hoe, Garretts' pattern, with their own improvements, the elevating and depressing movement being the chief. Their general-purpose drills do the firm great credit for clever arrangement, workmanship, and cheapness.

BENTALL has no less than three stands in different places of the gallery, owing to want of space for convenient showing. He has a first-rate collection of his own manufacture: his root-pulper now forestalling his celebrated scarifier, in public interest. We did not observe anything new as coming out since the Salisbury Meeting. That it is to novelties that throughout this report we have confined ourselves, having at that time entered pretty fully into a notice of all the known improvements.

E. R. and F. TURNER exhibit their customary and excellent assortment of agricultural machinery, consisting of roller mills, crushing and grinding mills, cake-breaker, chaff-cutter, circular-saw bench, &c., &c.

HORNSBY and SONS—Their unrivalled drills and dressing machines, so universally known as to barely need our notice of them as being present here.

LAWSON and SON, select specimens of wheat, oats, roots, &c.: their Lothian purple top continues to give great satisfaction, being a near approach to the firm flesh of the swede. Their Tweeddale yellow and Kohl rabi are very fine roots. The stall was a fine exhibition of roots of Scotch growth.

SKIRVING'S stall is as attractive as ever—some immense swedes and carrots. The swedes retain their character in shape, quality, and size, and are now become quite a known sort everywhere.

Binns' manures deserve notice. He shows a sample of wool manure.

Barrett and Exall's stand commands attention by a large display of medals. But this is not all; their show of implements and machinery is very superior, consisting of a good assortment of their excellent manufacture. We think their names so well known that we need not add more.

Angel and Co. make a selection of agricultural books and almanacks. They appear desirous to aid in agricultural literature by a choice selection.

Crosskill and Co.—This, again, is a firm so well known, and the implements and machinery they exhibit are so highly appreciated, that it seems to us quite out of place to do more than notice them otherwise than in this general way: all was as is usual with them.

Thorley called attention to his stand of samples of flour for cattle food by the display of a magnificent gold cup, which he is desirous to present to the Royal Agricultural Society for their gift to the farmer who shall fatten the most cattle best from his prepared food.

Archer brings forward some useful nose pincers or cattle leaders, at 2s. 6d. each.

Tree and Co. show Ewart's cattle gauges, and Casella's weather instruments.

Grove (James) has his usual good collection of roots; his long red Bugle mangels are excellent; turnips, &c., in good variety. We are pleased to see him keep up so good a stock.

Richmond and Chandler take their usual prominent position in the exhibition gallery; amongst their machinery and implements we noticed a very useful and cheap chaff-engine for small occupations, price £3 15s.

Snowden (W.) exhibits a chaff engine and bruising mill. The chaff engine has a large feeding-box, and is a large machine to be worked by one person; it does not feed by rollers, but by a web underneath; the feed "only comes forward when the knife is from it;" its novelty deserves attention.

Holmes and Sons send their manure-distributor, drill, and other machinery and implements; their weighing machines have long stood high in public favour: they have also chaff engines, corn crushers, cake breakers, turnip cutters, and pig troughs in good variety; their corn-dressing machine is popular.

Moore and Co. have churns in variety; the Yankee churn the chief attraction. We did not see the Yankee reaper.

Swift Brothers show their patent washing, wringing, and mangling machines, liquid-manure pump, corn bin, &c.; all very good.

Cullingford (W.) boasts of very excellent garden netting, sheep-fold netting, rabbit nets, carriage-horse nets, fishing-nets, &c., some from cocoa fibre.

Page and Co. had a capital root-stall, immense cabbage, mangels, and turnips; six of Skirving's improved weighed 110lbs., and six mangels weighed 193lbs.; the largest specimen of mangel we noticed was on this stand, its weight 44lbs.; turnips in fine variety.

Barnard and Bishop have their celebrated root pulpers in variety.

Selby Hand, a combined crushing mill, sack weighing machine and lifter.

Picksley, Sims, and Co.: Chaff cutters, mills, washing machines, chain harrow, lawn mower, and wringing and mangling machine.

Goddard: A very complete kitchen range.

B. Fowler and Co.: Cast-iron and bored pumps, wrought-iron pumps, liquid-manure pumps on tripod stands, and iron stable pails. These pumps last year obtained great attention from their double action, thus keeping up a continuous flow of water; "the piston is solid, and all the valves being out of the barrel, permits their areas to equal that of the piston, and the water passages to be proportionately large;" the arrangements of the details are very good, the application of Holman's patent reciprocating lever being an improvement.

James exhibited his liquid-manure carts.

T. Hunt and Brothers: A clover and trefoil seed drawer, chaff engine, scythes, and a variety of other useful farm machinery; well worthy a better notice.

Sigma: Dibbling implements, &c.; specimens of wheat unusually fine.

Carsons's chaff cutters, scarifiers, mills, crushers, pulpers, hay rakes, ploughs, &c., stand deservedly high in public estimation.

Impey shows his well-known dressing machine.

Smith and Sons, their truly-valuable drills, of simple construction and excellent manufacture; we believe this firm is the oldest in drill machinery extant.

Cambridge sends his chain harrows; we suppose the regulations relative to weight (not to exceed one ton) would preclude the exhibition of his large rollers.

Samuelson showed his Gardner's turnip cutter in variety, as also several pulpers, corn crushers, chaff cutters, pumps for irrigation, and foldyard washing machines, and a variety of other useful articles, in character with his long-established reputation for first-class machinery.

Williams' celebrated harrows were among other things exhibited of highly useful character.

Reeves.—In addition to his celebrated Chandler's liquid manure drills, which he has improved by an alteration of the speed of delivery, showed a garden or one-row drill. This can be made to deposit seed continuously or as a drop or "bunch" drill; the regulation is by discs with perforated holes of various sizes inserted in the upright cylinder containing the seed; these are turned as the drill proceeds, and the seed drops through. The height is regulated by the diameter of the wheel, but it is requisite that the dropping should be close to the soil for "bunching." Price £3 10s. A new invention by Mr. Reeve.

Woods exhibited a section of his poppy extirpator, pulper, and other useful articles.

Delf entered a new invention for opening furrows, or rather for taking the sheep droppings with the furrow sole out of furrows on seed pastures, and distributing them over the surface. It is of similar form to Bentall's scarifier—say with one share on—and it has two long iron plates four or five feet by six inches, which expand and throw soil and manure over the surface. I is novel, but did not appear to us a very useful implement for its price, £10 10s.

Warren's expanding plough we heard was here, but we did not see it.

Luck's dressing machine with patent elevators for weighing, together with his mills, constituted his standing. The dressing machine is very popular.

Fisher exhibited his very useful horse-rake, mounted on his other implements for want of space. His cake mill is cheap; and his other exhibition consisted of bean, oats, and barley mills, chaff engines, &c.

Purdie and Co. brought washing machines and knife cleaners. The washing machine is an oblong chest, with dashers.

Read's cattle probangs, &c., and garden engine came next in our walk.

Smith and Ashby exhibited a well-known assortment of their most useful implements; the latest improvements in their chaff-engines, being a newly-invented patent safety presser: this is a lifting roller immediately behind the cutting front, which prevents clogging. Their chief novelty in this show is a 2½ horse power steam engine, which can be used to work machinery, or is easily converted into a steaming apparatus by turning the steam into steam cylinders or tubs; price £60.

WALLIS and HASLAM have a good selection of implements; their two-horse portable thrashing machine is good for small occupations.

WHITMEE.—His flour mills, crushing mills, &c.

BOBY's Screen.—This screen has received an improvement; it will now separate into three distinct qualities. It has an additional separator like a flat box, fixed in front, and receives beans, peas, &c., which it deposits by spouts behind.

BARTON's stable fittings are very complete throughout; his self-acting rack keeps the hay always within reach of the horse, by the elevation of the bottom, like as sash windows are raised.

BOYD's dairy and washing utensils are worth a closer inspection; he also shows a variety of implements.

BRIDGES has an almost infinite collection of butter prints, of very pretty devices suited to the purpose.

BURNEY and BELLAMY have iron cisterns of various sizes.

THE ST. PANCRAS WORKS show varieties in mangers, stable fittings, and furniture, specimens of wire and iron fencing, hurdles, field-gates, and wire netting.

JAS. HAYES.—Grinding mill, straw elevator pattern, &c.

S. SKYE AND CO.—Coffee-mills, sausage mills.

PERREAUX's patent pump is a capital general purpose pump, and its india-rubber piston-valve has proved well under severe trial.

WHITEHEAD shows his very superior brick and tile machines, which have received many honours from our different societies at home and abroad. His pug machine is exceedingly good.

THOMPSON's haymaking machine and horserake—two very superior implements, of which we reported favourably in our Salisbury report.

COLEMAN displays his Hanson's prize potato digger, his scarifier or cultivator, harrows, &c. Hanson's potato digger is *the* implement of the year: its capabilities are great—it will clean a ridge of potatoes without difficulty, throwing them abroad for picking so that all can be readily gathered. It has been more than once described in the *Mark Lane Express.* "Coleman's cultivator" is assuming a new position. He has succeeded in adapting it on a large scale for steam cultivation. Its adaptation was fully proved at the great meetings of Salisbury and York, where it was worked by Boydell's traction engine.

CROWLEY and SON show a truly well-made and very useful cart, the wheels run on bevel tire or square level soles. Tipping apparatus very good.

OLIVER MAGGS exhibits a good assortment of machinery. Chaff engines, cake breakers, turnip cutters, bean and other mills and crushers, &c., &c.

SMITH's steerage horse hoe is the best of its kind, and after Goorka pattern. Delving machine good.

WHEELER sent his patent root grater, turnip cutter, circular saw, and bean mill. The circular saw is a very useful machine.

COTTAM and HALLEN have an attractive stand, consisting partly of stable fittings, in variety of racks and mangers. Their new triangular manger, for corners, is a very convenient one. We noticed a good and unique corn-bin of sheet-iron. Their stable furniture, containing every requisite, is excellent. They make a small portable liquid manure pump to run on its own wheels, the pipe of vulcanized India-rubber. It is of very simple arrangement; can be moved to any cesspool for emptying it, &c.

HALIFAX and Co. display their farmers' account books, recommended by the Royal Agricultural Society of England, containing five books, *i. e.* for weekly transactions—sale, purchase, ledger, and cash respectively.

RANSOMES AND SIMS occupy the most extensive stand in the gallery, consisting of ploughs in great variety, chaff engines, cake-breakers, crushing mills for every farm purpose, with other machinery of their almost unrivalled manufacture. We did not observe any new invention or recent improvement of moment; while to give here any extended notice to describe the uses and exquisite finish of *their* implements and machinery, would indeed be superfluous.

THE ROYAL DUBLIN SOCIETY'S EXHIBITION.—The efforts of this Society have done much for Ireland. It was established so far back as 1731. It now enjoys a Government grant of £7,000 annually, besides annual subscriptions amounting to £2,000. An entrance fee of £20 with an annual subscription of £1 1s. constitutes an honorary member, and an entrance fee of £5 5s. with an annual subscription of £1 1s. an annual member. The specimens on the Society's stands were a portion of those shown at the Society's winter exhibition of farm and dairy produce, held last month on their premises in Dublin. The several roots, and samples of cereals, pulse, wool, and butter, were principally contributed by the following noblemen and gentlemen: the Duke of Leinster, the Earl of Charlemont, Col. Kane Bunbury, the Marquis of Waterford, Major Quentin, Doctor Taylor, Doctor Collins, the Commissioners of the Board of National Education in Ireland from the Albert Model Farm and several of their district model farms, J. H. Peart, Doctor Radcliffe, LL.D., J. E. V. Vernon, Lord Talbot de Malahide, the Marquis of Kildare, &c., &c. The Royal Dublin Society exhibited, for the first time, collections of Irish-grown produce at the Smithfield Club Show in 1851, at the request of the Earl of Clarendon, then Lord-Lieutenant of Ireland, and, by virtue of his office, President for the time being of the Society. The good results which attended that step are well known in Ireland and in this country. The collection shown at the Smithfield Club Show during 1851 and the subsequent years brought before the British capitalist the capability of the soil of Ireland for the production of white and green crops, "the great reproducers of beef;" and English capital, still further stimulated by the Great Irish Exhibition of 1853, flowed freely into Ireland, and was largely employed in land speculations, which turned out to be of a permanent and highly remunerative kind. The Council of the Society have sent forward this year a collection of excellent farm products from various parts of Ireland; and there are cards affixed to each lot, setting forth the particulars of the various modes of cultivation, quantity and quality of manure, time of sowing, and every particular which may be useful to the practical farmer, or others interested in husbandry.

Mr. HALKET has a miniature field set out, to show his new system called guide-way culture. It did not appear to us very feasible, and must involve, in a great degree, a new order of agriculture.

NICHOLSON's celebrated haymaking machine has our unqualified praise. His assortment of machinery is exceedingly good; his dressing and screen machines are superior and cheap; he has a capital machine for breaking thick cake; grinding-mill, very serviceable. He was prevented showing his newly-invented 2½-horse power steam engine, owing to the regulations not permitting, as it weighed 1 ton 6 cwt. We saw some machinery we thought equally heavy. We hope in all cases one rule was adhered to.

SAWNEY exhibited his renowned hariff-screen attached to his almost equally-noted dressing machine.

STACEY had his barley-hummeller and chaff-cutters; the former has the long cylinder, in which revolves a spindle armed with steel knives in a spiral form.

SPILL—specimens of rick-covers, tarpaulins, horse-cloths, and other covers.

Johnson—his box-churns in variety, improved from the Yankee pattern.

Impey—turnip and mangold graters, Taylor's invention.

Bradley exhibits samples of his fattening food for cattle, &c.; horse or cattle 42s., pig ditto 24s. per cwt.

The mincing machines exhibited by Taylor and Buckingham must not be omitted—so simple and effective. Richmond's box-churn is worthy of better notice than we can afford. Humphries' double cider-press is a valuable aid to cider-makers: their winnowing-machines and perforated riddles are well known. Their clover-machine is good; and here we notice Smith's patent steam cultivator, of which they are agents, but which we cannot stay to describe. It is now before the world.

A. and T. **Fry** make up an interesting stand. Their double-press plough by Cousins, their corn-crushers, kibblers, root-graters, churns, draining tools, hand hay-rake, and other implements, demand an extended notice; but our space is more than filled.

F. **M'Neil** and Co., as usual at all our great meetings, bring forward their asphaltic felt, so admirably adapted for cheap roofing.

GENERAL MEETINGS.

Tuesday, Dec. 8 1857.

The Duke of Richmond, President, prevented attending, in consequence of being with his regiment of militia.

Cases of doubtful qualification of animals referred to Stewards.

Officers re-elected: President; vice-presidents; trustees; hon. secretary.

Mr. Quartly elected Steward of Cattle and Long-wool Sheep in place of Mr. Hole, who retires by rotation.

Mr. Henry Waters elected Steward of Short-wool Sheep, Cross-bred Sheep, and Pigs, in place of Mr. Frost, who retires by rotation.

New Members elected.

Thursday, Dec. 10, 1857.

Report of Stewards on cases referred to them presented.

Mr. B. E. Bennett's motion for a new Class for Welsh Steers under four years old, was not carried.

The Prize Sheet to remain as settled last year.

THE ANNUAL DINNER.

The annual dinner of the Smithfield Club took place on Wednesday evening, at Freemasons' Tavern. In the unavoidable absence of the President, His Grace the Duke of Richmond, the chair was taken by Lord Berners.

The attendance was larger than usual, the number present being about 160. The company included Lord Feversham, Lord William Lennox, Vice-Chancellor Kindersly, Mr. Western, M.P., Lieut. Col.-Towneley, Mr. Henry Wilson, Mr. C. T. Tower, Mr. H. Brandreth, Rev. Mr. Tooke, Mr. W. Fisher Hobbs, Mr. Mechi, Mr. W. Hole, Mr. Sandy, Mr. Torr, Mr. Brandreth Gibbs, Mr. J. Raymond Barker, Mr. R. W. Barker, Mr. S. Druce, Mr. G. P. Tuxford, Mr. R. W. Baker, Mr. Jonas Webb, Mr. Wilmore, Mr. Badham, Mr. Buckley, Mr. Corbet, Mr. Wortley, Professor Simonds, &c., &c.

The dinner, an excellent one, was admirably served. The musical arrangements were under the able direction of Mr. Genge, who had the assistance of Miss Wells, Miss J. Wells, Mr. Shoubridge, and Mr. Smythson.

On the removal of the cloth, the grace from the "Laudi Spirituali" was sung.

The **Chairman** then rose and said he had to express his deep regret, a regret which he was confident they all shared with him, at the unavoidable absence of the noble duke their President, in consequence of which he (Lord Berners) had, in compliance with the request of the committee, accepted the office of chairman that day. It was now his pleasing duty to propose to them "The Health of our illustrious and gracious Queen" (cheers). This was a toast which ought always to stand upon its own merits, and it required no eulogium from him to ensure for it an enthusiastic reception. It might not, however, be unbecoming if at this particular juncture he added his fervent aspiration that an Almighty Providence might so direct her Majesty's councils that they might tend to secure a speedy restoration of peace in her foreign dominions, and increase the social happiness and prosperity of her people.

The toast was drunk with three times three, and followed by the National Anthem.

The **Chairman** would now give them "The Prince Consort, the Prince of Wales, and the rest of the Royal Family." The Prince Consort, he observed, had claims upon their respect, not only as the husband of our beloved Sovereign, and the father of that family in whom the hopes of England centred, but as the patron of arts and agriculture, and as a member and a successful competitor at the Smithfield Show (cheers).

Serenade.—"Bless'd be the Home."

The **Chairman** again rose, and said that there were certain times and circumstances which rendered the next toast especially interesting, and he thought it should be given on the present occasion in that assembly, although it had not been the custom at these annual gatherings to do so. The toast he had to propose was "The Army and Navy of England" (loud cheers). When he considered that the mind of every Englishman and every Englishwoman, and he might add of every man and woman in the civilised world, had for some time, and was even now, turned with absorbing interest to the achievements of our army in the East, he felt that he should hardly be doing his duty if he did not, at a meeting of British farmers such as this, give them an opportunity of expressing their respect and admiration for the military and naval services of their country (cheers). All hearts had of late been painfully affected by the unparalleled atrocities and barbarities that had been committed by the rebel troops in India. Their blood had run cold in their veins as they read the accounts which had reached them of the barbarities which had been perpetrated upon innocent and defenceless women, with children hanging at their knees, and infants at their breasts. The foul deeds which had been committed were, in short, such as were unrecorded in history. But as they contemplated them with the feelings of emotion they were calculated to evoke, they turned with hope to those gallant bands of our countrymen who were engaged in avenging the cause of outraged humanity, and to whose exertions alone we should owe it, if ever the territory of India was restored to the authority of the British crown (cheers). When they reflected on the comparatively small numerical force of the British troops in India, and the difficulties they had had to encounter in a climate and at a season of the year when it was thought almost impossible for European soldiers to traverse that country; when, notwithstanding this, they reflected upon the rapidity of their marches, their indomitable courage and perseverance, and the military skill which had been displayed by their intrepid commanders; that, unaided by reinforcements from home, they had contended successfully, not with an undisciplined rabble, but with troops disciplined by our own officers, armed with our own weapons, and having an artillery force in the city of Delhi alone that numbered 270 guns, manufactured in our own arsenals; that the military defences of that and other cities in revolt in India were all constructed by English engineers; and that the magazines and munitions of war in the hands of the rebels were almost unprecedented in amount—then he did say that the army of England in India was entitled to the gratitude and thanks of the country at large (cheers). And here he would mention the high compliment which had been paid to our government and army by the Emperor of the French—a compliment such has had never before been known, and which ought to be sounded in terms of praise from one end of the kingdom to the other; for it was a guarantee of the fidelity and of the friendship which the Emperor entertained and had expressed towards us (Hear). When the rebellion broke out in India, and it became necessary to send out reinforcements by the quickest route, the Emperor Napoleon, with the magnanimity for which he had rendered himself conspicuous, offered to allow the army of England, in any numbers, to pass through France (loud cheers). Now, the Pacha of Egypt, acting in the same spirit, volunteered to facilitate the transit of our army across the Isthmus of Suez (renewed cheers). It was hardly necessary, perhaps, that he should mention the names of the heroes who had distinguished themselves during these troubles in India. They were "famillar in our mouths as household words;" still he might be excused if he referred to a few of those to whom they were anxious to do honour. There were Neill and Nicholson, and other brave men, who had fought and bled in their country's cause. There were others who, he trusted, still survived, and who only last night received from parliament an acknowledgment of their gallant services; he alluded to General Wilson and General Havelock (tremendous cheering). There were also Greathed (cheers), and Outram and Eyre of the Punjaub, the devoted Salkeld, unequalled for his gallant daring (cheers); Lawrence, Home, Wheeler, Chamberlain, Cotton, and Edwardes (loud cheers). All these had distinguished themselves by their heroic qualities and military skill, and had covered themselves with glory. He was sure, therefore, that the present assembly would, with the warm enthusiasm of grateful hearts, drink to the health of our Army and Navy. (The toast was drunk with loud and protracted cheering.)

Lieut.-Colonel TOWNELEY, in returning thanks, said that he had not the honour of being connected with the regular army, but he begged to say that he sympathised fully in the expression of admiration which had fallen from the Chairman for our gallant troops in India; and that he had taken the command of a regiment of militia for the sole purpose of giving greater facility to the efforts of our army abroad (cheers).

Glee—"Blow, gentle gales."

The CHAIRMAN would now propose to them what was generally considered, at these gatherings, as the toast of the evening, and he was happy to state that any difficulty he might have experienced in giving it had been entirely removed by the able pamphlet which their excellent Secretary, Mr. Gibbs, had recently published, and which contained a history of the Club from its commencement (Hear). He was quite sure that he only echoed the sentiment of every member when he expressed his thanks to Mr. Gibbs for the trouble and pains he had taken in drawing up that report (Hear, hear). It appeared, then, that the Smithfield Club was established so early as the year 1798, and that in 1800 it comprised only fifty members. In 1838 the Royal Agricultural Society of England was originated in this room, and he well remembered being present on the occasion, and being consulted, with many others, upon the subject. The statement contained in Mr. Gibbs' pamphlet, therefore, he could take upon himself to say was perfectly correct, and that the Royal Agricultural Society did derive its origin from this (Hear, hear). It was also noticed in the pamphlet that the show was removed from the inconvenient situation in Goswell-street to Baker-street, in 1839; and that her gracious Majesty visited the yard in 1844, and again in 1850. In 1841 the Prince Consort became a member of the Club; and how the institution had gone on and prospered to the present time all who were in the habit of visiting the show could tell (cheers). The members of the Club now numbered, he believed, about 300; and he might state, not as a matter of boast, but as a matter of fact, what could not be said of any other society in the kingdom, that with these 300 members they were enabled to give prizes to the amount altogether of £1,250 (loud cheers). The interest which their annual shows excited in the metropolis and throughout the country, proved the extent of the interest which was everywhere taken in agriculture, and that the community at large approved of the farmers of England uniting together for the purpose of devising the best means of producing for the population the greatest amount of animal food at the cheapest possible rate (cheers). Now, that was the main object of the club (Hear, hear). It was for that it was established, and in that it had succeeded. But notwithstanding the interest which was manifested in the show-yard, it was impossible to appreciate all the benefits which accrued to the country at large from the operations of the Smithfield Cattle Club (Hear, hear). It was all very well for their friends in London to go into the yard and admire a beast; but they should go into the country, into the country markets, and into the tenant farmers' homesteads and the tenant farmers' fields. There they would see for themselves the increased value given to cattle. There they would see the aptitude to feed and fatten, and there they would see the development of early maturity; all of which showed that the club were doing good service to their country by promoting the production of the largest amount of food for the people at the smallest possible cost. He would detain them no longer, but at once give "Success to the Smithfield Cattle Club."

The toast was drunk with three times three, and great applause.

Mr. GIBBS, the Honorary Secretary, then read the list of winners of the gold medals at the exhibition of the club for the present year.

The CHAIRMAN, in presenting the gold medal for the best steer or ox in any of the classes to Mr. Wortley, congratulated that gentleman on his success, and expressed the pleasure he felt that the medal would be taken into his own neighbourhood. In conclusion, he proposed Mr. Wortley's health.

Mr. WORTLEY returned thanks, and assured the company that he felt the highest pride in being able to contribute another laurel to the chaplet worn by the agriculture of his native county.

The CHAIRMAN next presented Colonel Towneley with the gold medal for the best heifer or cow in any of the classes, and announced that that was the twentieth gold medal which the gallant colonel had won in various parts of the kingdom (cheers). He begged to propose his health.

Lieut.-Colonel TOWNELEY acknowledged the compliment, and assured them that he esteemed it a very high honour to be a second time the winner of the gold medal of the Smithfield Club. His success, however, he attributed more to the judgment and skill of the gentleman from whom he had obtained his herd, than to any merits of his own. He got that herd from a gentleman who had been bred up with a knowledge of the good points of an animal from his youth, and when he (Colonel Towneley) came into the estate, that gentleman, having more to do than he could well manage, gave up his herd to him; and that was the commencement of his own operations. He had now been in the trade, he might say, about eight or nine years; and another cause of the success he had achieved was that he had always endeavoured to get the best males and the best females together. If they got really good blood they were almost certain to produce a good animal. The ox which he had had the pleasure of showing in the yard this year was from a common milking cow which he had bought in the market. He forgot the price he had paid for her, but it was certainly under £20. The ox, he believed, was not a bad one; and it had been produced by a single cross with a good bull. Indeed, he could not recommend farmers to do better than to get a good male animal for whatever stock they happened to have. He had placed a good bull at the disposal of his tenants, and he believed that by this means he had improved the value of their stock from £1 to £3 a-head (cheers). It should not be forgotten, either, that the most valuable animals were good milkers as well as good breeders (hear, hear).

Lord FEVERSHAM then presented the gold medal awarded to the best pen of long-woolled sheep in any of the classes, to Lord Berners.

The CHAIRMAN said the pleasing task now devolved upon him of proposing the health of their President, his Grace the Duke of Richmond, as the winner of the gold medal to the best pen of one year-old short-woolled sheep (cheers). Than the name of the Duke of Richmond, he was sure there was none more acceptable to the farmers of this country (Hear, hear). At periods when the interests of agriculture had been assailed, they had known him as the faithful friend of the farmer, and such they had invariably found him to the present day. He regretted the absence of his noble friend on this occasion; but it arose entirely from a sense of duty. His noble friend was devoting himself to completing the organisation of the militia of his county, and in a letter which he had written to the Society he stated that he did not wish to be absent from that militia a single day, whilst he thought his presence amongst them was of importance. If he (Lord Berners) might be allowed to address a word to his brother-farmers in reference to the militia, he would observe, that it was in the power, as it was the duty, of each and all of them in their several stations, when they returned to their homes, to assist in recruiting by volunteers that truly constitutional force (Hear, hear). And let them remember that every man who joined the militia at the present moment was filling the place of one of those known and tried soldiers who had been sent to that part of the world where their services were most required in the interests of the country (cheers). With these remarks he begged to give, with three times three, "The Health of his Grace the Duke of Richmond, the President of the Club, and a winner of the gold medal" (cheers).

The toast was drunk with enthusiasm.

Song by Mr. Shoubridge—"The Yeomen of England."

Lord **WILLIAM LENNOX** said, on rising in obedience to a call from the chair, he must claim the indulgence of the assembly, as he was not prepared when he came there to take part in the proceedings of the evening. He had come in the expectation that his brother would be there; and it was not till after entering the room that he learnt that he was detained on duty. The diffidence which he always felt on rising to address a public assembly was increased on that occasion by the feeling that he stood there alone, probably, in perfect ignorance of land and cattle, and of anything appertaining to agriculture. They were all aware that a younger son of a noble family did not inherit a very large portion of the broad acres of his ancestors; they were probably aware that his share of the soil generally consisted of the mignonette-pots outside his window, and his live-stock of a half-starved pointer (laughter). It was not necessary, however, either to own land or to breed stock in order to understand the benefit conferred on the country by a society which aimed at securing good and cheap food for our rapidly-increasing population (Hear, hear). Having explained the position in which he stood, he now begged to thank them, on behalf of his brother, for the kind manner in which they had drunk his health. In early life his brother entered, along with six of his brothers, the profession of the army. He saw service under the Duke of Wellington; and perhaps what he had most reason to be proud of in his military career was the fact recorded by Napier, that he left the staff of Wellington to do duty as a regimental officer of the line (Hear, hear). Those times were now long past; but his conduct with regard to the militia was such that he might fitly be compared to an old warhorse, who, on hearing the sound of bugle or trumpet, immediately manifested a determination to live or die in active service (cheers). As an illustration of that sort of feeling, he might mention that about Christmas last year, his regiment being at Brighton, he left a comfortable home to dine with the officers; and when he got there he found only an ensign and an orderly officer, all the rest having gone away Christmasing (laughter). That showed how much his heart was wrapped up in his regiment. He (Lord W. Lennox) trusted that under the new state of things no difficulty would ever be experienced in obtaining recruits for the army. As long as a portion of the money nominally paid to the men was deducted on various pretences, it was natural to suppose that there would be a scarcity of recruits; but now that the recruit knew exactly what he was receive, and so much encouragement was given to the soldier, he thought they might expect to see the ranks of the army not only filled, but comprising a better class of men than formerly entered the service. To return to his brother. He was quite sure that nothing but a regard for military duty would have prevented him from occupying the chair. He believed he was at Dover, where his militia regiment was stationed; and that the cause of his absence was a little unpleasantness between that regiment and a regiment from Ireland, which he was desirous of removing. He should tell him of the manner in which his health had been drunk, and he was sure he would be gratified at receiving the information. Might he long be spared to preside over that excellent institution, and to promote as far as he could, in public and in private, the interests of the agriculturists of this country! (Cheers).

Lord **FEVERSHAM** said the duty had devolved upon him of proposing the next toast, and it was one which he was sure every gentleman in that room would receive with the warmest feelings of gratitude, being the health of his noble friend Lord Berners, who had so ably and efficiently discharged the important duties of the chair that evening, in the absence—in the unavoidable absence, as they had just been informed—of the President of the Club, the Duke of Richmond. In proposing that toast, it would be superfluous in him to detain them by offering any observations of eulogium or commendation. His noble friend was well known to the agricultural community as a practical farmer. He had long devoted a large portion of his time and attention to agriculture; he had made it his study, and he was at all times ready to impart information to those who consulted him on subjects of importance. His noble friend was, as they were aware, not only a practical agriculturist, but also a successful exhibitor of stock (Hear, hear). The gold medal had just been presented to him in that capacity; and perhaps he (Lord Feversham) might be allowed to observe, that his own county—York—had partly contributed to his noble friend's success on that occasion, inasmuch as his beautiful sheep were descended from a flock belonging to a gentleman who resided in his (Lord Feversham's) neighbourhood. They were aware that his noble friend now filled the important office of President of the Royal Agricultural Society. He was confident that in presiding over the proceedings of that great institution he would always manifest ability, fairness, and judgment; and that whenever any suggestions were made in the council with a view to improvement, however humble might be the person that made them, they would be listened to patiently, and receive due consideration. He might add, that it was the opinion of some eminent members of that society that there was still room for improvement; and he hoped that if any observations were made in relation to that subject at the meeting to be held on the following Friday, his noble friend would receive them with that courtesy for which, no less than by his firmness, he had always been distinguished. He had no doubt that his noble friend would retire from office with a reputation for ability inferior to that of none of his predecessors. He would now propose that they should drink, "Lord Berners, and Success to the Royal Agricultural Society of England."

The toast was drunk with great enthusiasm.

The **CHAIRMAN** said his noble friend and school-fellow Lord Feversham had imposed upon him one of the most difficult tasks he had ever been called upon to perform. He had mentioned his name in so many different points of view, that he hardly knew where to begin or where to end, and therefore he thought he had better discard all the compliments which had been paid to him, and once for all thank the company, as he did most heartily and sincerely, for the honour which they had done him, by the manner in which they had received the toast. There could not, in his opinion, be a higher compliment paid to any man than by his name being well received by the farmers of England. From his earliest youth he had been in the habit of meeting the cultivators of the soil in every part of the country. It was from that great patron of agriculture Mr. Coke, of Holkham, afterwards Lord Leicester, that he received his first instructions in agriculture, and from that time to the present he had constantly met with the greatest kindness at the hands of English farmers. His name had been coupled with that of the Royal Agricultural Society, of which he had the honour that year to be the president. He could only say that it would afford him the greatest gratification to see the meeting at Chester rival, if it did not exceed, as he expected it would, all the preceding meetings of the society (cheers). He could assure his noble friend that he was not mistaken in supposing that he would be prepared to listen attentively to any suggestions that might be made for the improvement of the society, and especially would this be the case if they proceeded from practical farmers. It was by the union of science with practice that the council aimed at carrying out the objects of the society—objects of national importance, and of a similar nature to those of the Smithfield Club. That day the council had agreed to their report, and it might not be uninteresting to some present to hear a little about their proceedings. It appeared that during the last year they had gained an accession of 150 members, and that the total number was now 5,218. There was one subject which the society had taken up, for their conduct with regard to which he thought the farmers of England ought to feel especially grateful to them. When it was reported that a terrible plague was prevailing among cattle in Austria, Prussia, and other continental countries, the Royal Agricultural Society, acting in conjunction with the Highland Society of Scotland, and the corresponding society in Ireland, took up the matter, and sent over Professor Simonds to ascertain the causes of the prevailing disease. The Professor had since made his report, and he trusted it would shortly appear in the society's Journal (cheers). He might also mention that at the Salisbury Meeting the visitors exceeded by 2,000 the number that attended on any former occasion (Hear, hear). At the Chester Meeting, the prizes would exceed in amount those that had ever before been offered by any local society; he believed the amount would be upwards of £1,260. The society had done much to diffuse sound principles in reference to agriculture, and, having regard to that general fact, and especially to the improvement which it had been instrumental in effecting, by bringing forward implements combining cheapness with simplicity and efficiency, he thought it might be said that the society had not failed to perform its duty (Hear, hear). He hoped that all present would endeavour to come to the meeting at Chester, and to bring friends with them, and that he should be enabled to feel that the society had not suffered in efficiency and usefulness during his presidency.

Ballad by Miss M. Wells—"Oh, yes, I love thee."

Vice-Chancellor Kindersley said—In obedience to a command—for he considered a request from the Chairman equivalent to a command—he rose to propose a toast, with which he had the honour to be entrusted. He must begin by apologizing for venturing to address an assembly of persons familiarly acquainted with agriculture, he himself being entirely ignorant on that subject. Though he had the honour to be a judge in equity, he confessed he was no judge of Southdowns or Leicesters (laughter). With regard to cattle, he believed he did know a poll-cow when he saw one; and when he met with the word poll-cow, it was involuntarily associated in his mind with a deed poll (laughter). He knew nothing of the distinction between longhorns and shorthorns; the only horns with which he had any familiarity were the horns of a dilemma in argument (renewed laughter). But, although he was profoundly ignorant on this subject, he was not so unobservant of what was going on in the improvement of agriculture as not to feel astonished at the extraordinary success which had attended the efforts of that and similar societies. Particularly had he observed the advance made in the case of pigs, of which he begged to say he was no less ignorant than of cattle; but when he saw the outward improvement which had taken place in the skins of pigs, and observed the gradual refinement of their coats, he could not doubt that in time they would be able to realize the making of a silk purse out of a sow's ear (laughter). Although he was unconnected with agriculture, he might not perhaps be altogether out of place there. He did not, indeed, belong to the class of breeders, not to the class of feeders, nor to another class, without whom he presumed they would find it difficult to get on, he meant the butchers; but he belonged to a class without whom he would like to know how they would get on at all, namely, the consumers (Hear, hear); and it was as a humble representative of that very numerous and by no means unimportant class that he ventured to address them. But looking at this matter in a more serious point of view, he confessed that he felt very deeply impressed when he found himself in the presence of gentlemen who were concerned in the pursuit of agriculture, and more particularly of gentlemen who were engaged in the breeding of cattle. He felt that he was in the presence of those who were the descendants and representatives of the old yeomen of England—the backbone of the nation—who had for centuries past maintained the vigour, and force, and character of this country in a manner with which they were all familiar historically, and of which they were all justly proud (cheers). Moreover, the interest which attached to that society was enhanced by the fact that the gentry and aristocracy, including some of the highest nobles in the land, united with the farmers in efforts to achieve what was undoubtedly a work of great public importance, namely, the increasing the quantity, improving the quality, and cheapening the price of what was a most important article of food in this country (Hear, hear). Still more was this the case when even the highest personage in the realm, next to the Sovereign, did not disdain to enter the arena and compete with the farmer; and he might add that he had no doubt his Royal Highness was very glad when he obtained a prize (laughter). In this respect the society had established an equality of the right sort—an equality which was perfectly consistent with the gradations and ranks of society. He had now to propose the health of certain gentlemen, who filled certain offices in that society, and who in filling them rendered, he was convinced, the greatest service to it; he meant the Vice-presidents and Trustees, including the Honorary Secretary, who, he was informed, was one of the trustees, and who, in addition to his other services, had recently prepared a history of the past proceedings of the club, which he was sure would be read by agriculturists in general with deep interest. If he might be forgiven for taking such a course in the presence of those to whom he had no right to suggest a word of advice or admonition, he would before sitting down remind the farmers of England of what appeared to him a very important part of their duty in this most momentous crisis. It was, of course, of the utmost importance at the present time that the ranks of the army and that of the nursery of the army, the militia, should be well and adequately filled; and he would suggest that it was a real duty devolving on every farmer and every landed proprietor in this country, instead of doing what he was afraid some individuals had done—he was sure none present had taken that course—namely, discouraging enlistment; it was, he submitted, the duty of all such persons to encourage the labourers to enrol themselves in the militia, in order that, in the absence of the regular troops, the shores of this country might not be left without that defence which from the earliest periods in our history, from the Normans, the Plantagenets, and the Tudors downwards, had always formed the greatest security of the nation (cheers).

After a cordial response to the toast,

Mr. Brandreth Gibbs, on rising to reply, said he regretted that it should have again fallen to his lot to return thanks on behalf of the Vice-presidents and the Trustees. He regretted it, first, because but for the unavoidable absence of his Grace the President this duty would have devolved on their noble chairman; and secondly, because the Vice-presidents and the other Trustees were also absent. He sincerely thanked them, however, for the manner in which the toast had been received; and for himself he would say that he was always delighted if his conduct met with approbation. The present show seemed to him to mark a positive step in advance, whether they looked at the number of animals exhibited, or whether they looked at the more fully-developed classification of breeds under which the stock was now exhibited. When this classification was introduced three or four years ago, it was regarded by some as an innovation, by others as an improvement; but in that little pamphlet which he had published he had shown that this classification was nothing new, but that the club had only reverted to a practice which existed in it some fifty years ago (Hear, hear). He thought the recurrence to the former custom in that respect had proved most beneficial. If they recalled the number of Devons exhibited a few years back, and then took a glance at the long range of such animals exhibited this year, they would perceive that the breeders fully appreciated the alteration (Hear, hear). He would not detain them longer, but, again thanking them for the compliment which had been paid to the Vice-presidents and Trustees, he would conclude by observing that if the little pamphlet of his which had been referred to proved acceptable and useful to the members, he did feel amply repaid for the time and labour which he had bestowed upon it (cheers).

Duet, by the Misses Wells—"We come to thee, Savoy."

Lord W. Lennox proposed, "The Unsuccessful Candidates," coupled with the names of Lord Feversham and Mr. Druce, junior. After some eulogistic expressions with regard to Lord Feversham, he said he had been informed that his lordship was successful as the exhibitor of a short-horned heifer at Birmingham, though he had not succeeded in London; and he was convinced that he had too much of the pluck of an Englishman to cease exhibiting in Baker-street because he had failed this year (cheers).

The toast having been duly honoured,

The Chairman said he was sure that if either Lord Feversham or Mr. Druce could give the company any information of a practical character, it would be gratefully received. He should be glad if his old friend Mr. Druce could tell them how he and his neighbours had succeeded in bringing the cross-breed to such perfection as they had done.

Lord Feversham said, as one of the unsuccessful candidates, he begged to return thanks for the honour which had been conferred upon them. As regarded his failure that year, he must observe, that had he ceased exhibiting when he was first unsuccessful, he should have stopped long ago (Hear, hear); and they might rest assured that his want of success that year would not deter him from coming forward again (cheers). It happened that in the very first year in which he exhibited in Baker-street, namely, in 1850, he obtained the first prize in his class, and the result was similar in 1851; but it did not follow because a man had bred a good animal one year or two years in succession, he could always do so. He assured them he had found the greatest difficulty in breeding anything like a perfect animal; and an animal must certainly be as nearly perfect as possible to give anyone a chance of carrying off a prize (Hear, hear). When he wanted a cross, he meant fresh blood, he generally had recourse to the large short-horned sales; and when he saw an animal that he liked, he did not mind bidding a high price for him (Hear, hear). Thus, some time ago he bought two very nice bull-calves at the sale of Lord Ducie's, each of which weighed about 420 lbs., neither being then more than six months old, and the result was very satisfactory. One of them gained a prise of 1,000 francs at Paris, and he afterwards sold it to a gentleman for 200 guineas. He agreed with Col. Towneley, that in breeding the great object should be to bring a good male and a good female together. It was an entire mistake to suppose that provided the male were good, it was comparatively unimportant what the female was (Hear, hear). Some difference of opinion existed as to what was most desirable in the case of short-horned cattle: he agreed with the late Mr. Bates that it was most desirable to have animals with nice soft hair, and thin—not too thin—soft, supple skins. He was convinced that such animals were the most easily fed, and would thrive the best. He had adhered to the principle of crossing the herd followed by the late Mr. Bates; and he was told that the farmers in his neighbourhood found that the cattle descended from his bulls fetched higher prices in the market than those which were not so well bred. He again returned thanks on behalf of the unsuccessful candidates, and repeated that he did not intend to cease exhibiting because he had not this year obtained the prize (cheers).

Mr. Druce, jun., also returned thanks, and said he hoped that next year he should be successful (Hear, hear).

Mr. Wilson, on rising to propose the next toast, observed that he could not say with their excellent friend Vice-Chancellor Kindersley that he was entirely unacquainted with agriculture; for although it might be long before he appeared as a competitor, his position was happily that of a learner. As regarded the learned judge, he might safely declare that all present would be glad to meet him there on future occasions, and that they would much rather meet him there as often as he could come than only once in the Court of Chancery (laughter). The toast which he had to propose was, "The Judges." They would, he was sure, all agree with him that those gentlemen occupied a very proud position; and unless the greatest confidence were reposed in them, it would be impossible for them to discharge their duties satisfactorily (Hear, hear).

Before the toast was drunk, the Chairman expressed a hope that the judges might be induced to make some practical remarks in reference to the breeding and fattening of animals.

The toast having been drunk with proper spirit,

Mr. Buckley replied on behalf of the judges.

The Chairman then proposed "The Stewards," and in doing so repeated the invitation which he had just given to the judges.

Mr. Hole briefly acknowledged the compliment.

Song by Miss J. Wells—"Bid me discourse."

The next toast was, "The Father of the Club, Mr. Wolstead."

The Chairman then proposed "The Butchers." He observed that the Club now offered a premium to the butcher who was the largest purchaser at the show; and said the tenant farmers of England would be glad to see among them some representatives of a class who were their best customers, on an occasion like that. The noble lord coupled the toast with the name of Mr. Jeffrey, the winner of the Butcher's Medal last year.

The toast having been duly responded to,

Mr. Sawtell, cattle salesman, said, on behalf of Mr. Jeffrey, who was a particular friend of his, he begged to return thanks for the toast. At the same time he would take the liberty of calling his lordship's attention to the very serious injury which was being inflicted on butchers through the exercise of the power vested in the magistrates of doing away with private slaughter-houses. It would be of no use for such beautiful animals to be brought to London if they had to go to a common slaughter-house to be killed (Hear, hear). The abolition of the private slaughter-houses would impose on butchers an extra expense of £483,000 a year; and he would leave it to his lordship to judge whether that burden must not ultimately rest on the consumer. He concluded by handing to the Chairman, and several gentlemen near him, a printed statement with regard to the loss which the change he complained of would throw upon the trade.

The Chairman said, by the rules of the Club they were precluded from discussing any subject that was likely to come before Parliament; but this he would say, that if there were any measure which injuriously affected the interests of the butchers of the metropolis, and therefore the tenant farmers of England, it would be his duty and his earnest desire to give his best attention to it where he could attend to it with propriety (cheers).

Irish ballad by Mr. Genge—"O, it's time I should talk to your mother."

Mr. Western, M.P., said he had been called upon to propose a toast, and he supposed the reason was that he happened to have a name which was formerly somewhat distinguished in the agricultural world, and belonged to a county which was rather celebrated for agricultural improvements. The toast was, "The health of the labouring classes;" and he was quite sure that in a meeting of British farmers it would meet with a cordial reponse (cheers). The farmers throughout the country now felt the necessity of endeavouring to diffuse intelligence and sound morality among the labouring population; and this not less for their own sake than for the sake of the labourers (Hear, hear). As the Vice-Chairman had alluded to the subject of recruiting, he would observe that now that such brilliant prospects were held out to recruits, it must be quite unnecessary to cripple the number of agricultural labourers required for the cultivation of the soil (Hear, hear). Having, as a member of the House of Commons, been summoned to London to consider the Bank Act of 1844, he rejoiced to find, as one result of his arrival in town, that this country had a large surplus in the Bank of England; and he hoped it would continue to increase. He would give, "The Agricultural Labourers."

The toast was received with much cordiality.

Madrigal, by all the singers—"Down in a flowery Vale."

The Chairman said, in parting with those whom he saw before him, he could not help saying how grateful he was for the kind support which he had received that evening; and he felt that he should not be doing his duty if he retired without giving a sentiment which was always given on similar occasions by the late Lord Spencer, namely, "Sorry to part, but happy to meet again" (cheers).

The company separated at about half-past 10.

METROPOLITAN CATTLE MARKET.

THE GREAT CHRISTMAS CATTLE MARKET.

Monday, Dec. 14.—Notwithstanding that the consumption of food has unquestionably fallen off, owing to the late panic in the commercial world; and although the prices of fat stock have, consequently, shown a tendency to give way, we never recollect a period during which so much general interest has been shown in reference to our fat stock shows as was the case here this morning. At an early hour the market was thronged with visitors from nearly all parts of the United Kingdom, as well as from the continent, to inspect and admire perhaps the finest collection of animals ever shown in this or any other market in the world. As the day advanced, the number of visitors rapidly increased, yet, from the enlarged space included in the market's area, there was ample room for close inspection without inconvenience.

That the show of Beasts was of the highest order of merit will be understood when we observe that fully nine-tenths of them were considerably *above* average weight, and otherwise in unusually fine condition. The increase, be it understood, was not so much in the quantity of fat carried by the collective breeds, as in their general symmetry. As was the case at Baker-street, there were not so many "obese marvels" as in some former years; but the absence of *extreme* fatness may be noted as one of the great merits of the present show. The fat being laid on evenly and well is the result of well-shaped and well-bred animals being in more general demand on the part of the butchers and consumers. Formerly, by dint of stuffing, fat was often deposited everywhere save in the right places; and the result was that the buyers of both Beasts and Sheep lost considerable sums by the stock when slaughtered. We hail this change in the system with much satisfaction, because we are perfectly convinced that our breeders and feeders have at length got into the high road to additional fame.

From the foregoing observations, it will be seen that the supply of Beasts was one of no ordinary merit, and we may now briefly glance at *each* of the leading classes, the more fully to determine their positive excellence. These classes we may call Scots, Herefords, Devons, Shorthorns, Sussex, and Welsh. When we consider the great disadvantages, as to climate, under which the Scotch graziers are suffering, compared with those residing in the "sunny south," great surprise may well be expressed at the wonderful animals which were shown from the "far North." Whether we carefully consider the high value of their primer, consequently most selling, parts to the butcher, and the superior quality of the inferior joints, it must be admitted that the word "perfection" may be fairly applied to them. Those who witnessed the splendid collection of Scots, the property of Mr. William Mc Combie, of Tillyfour, exhibited by Mr. Daniel Maidwell, will at once understand the bearing of these remarks. Not a fault could be found with them; though, on the other hand, it is to be regretted that they should have been reserved for an open market; still, they added greatly to the show, and proved to the world what Scotland really can produce. Mr. Mc Combie's ox exhibited in the bazaar was purchased by Messrs. Banister and Bedborough, of Windsor, to supply the royal table on Christmas-day.

The collection of Herefords has seldom, if ever, been equalled. Amongst it were very few what may be termed large animals, the supply being almost wholly composed of a size admirably suited for general consumption. As regards the Devons, the excellence of their condition was fully equal to the Herefords, and the "men of the West" mustered in full average strength. The Short-horns, too, were of more than average merit. There was everything to admire in them, even though the fat was not "plastered" upon them so much as at some former exhibitions. From Sussex there was an increased show of Oxen, all in first-rate order; but the graziers in that county can do even greater things by a more extended cultivation of the turnip. They have now a wide field opened to their enterprise and industry from a separate class having at length been allotted to them in Baker-street. There were about 300 extraordinarily prime Welsh runts on sale, and which elicited the marked encomiums of the visitors.

As regards the Sheep here to-day, we must admit that the supply, taken as a whole, fell short of our expectations. True there were some very fine and very large animals on offer; but the bulk of the show was of a second-rate character. And here is the result of premature forcing, and of what is termed "early maturity;" whilst, no doubt, an unfortunate selection of stock for crossing purposes has led to a decreased size and supply. Exceptions, however, should be noticed, and we have no hesitation in referring to choice specimens of the Lincolnshire long-woolled breed direct from that county. They were shown by Messrs. Eland, Hancock, Woodward, and Smith, and comprised 30 from the flock of Marshall Heanly, Esq, of Croft; 10 from H. Seals, Esq., of Wainfleet Hall; 29 from J. Byron, Esq., Marblethorpe Hall; 50 from George Saul, Esq., of Wrengle; 20 from — Bealbry, Esq., of Wigtoft; and 20 from R. G. Chatterton, Esq., of the latter place. There were also a few splendid Sheep of the same breed, the property of J. Cook, Esq., of Norfolk. The whole of them possessed that peculiar quality which the county of Lincoln is noted for producing, viz., a large proportion of meat, compared with size. In this respect the breed must be considered superior to what are termed the New Leicester. From Norfolk, Suffolk, Essex, and Sussex some fine Sheep came to hand.

The following return shows the numbers of Beasts shown, and the highest and lowest prices obtained for them on the great days in the last seventeen years:—

Year.	Beasts shown.	Prices.				
		s.	d.		s.	d.
1840	3,528	4	4	to	5	8
1841	4,509	3	8	„	5	0
1842	4,541	3	4	„	4	8
1843	4,510	2	8	„	4	4
1844	5,713	4	0	„	4	6
1845	5,326	3	6	„	4	8
1846	5,470	4	0	„	5	8
1847	4,282	3	4	„	4	8
1848	5,942	3	4	„	4	8
1849	5,765	3	4	„	4	6
1850	6,341	3	0	„	3	10
1851	6,103	2	8	„	4	2
1852	6,271	2	8	„	4	0
1853	7,037	3	2	„	4	10
1854	6,181	3	6	„	5	4
1855	7,000	3	8	„	5	2
1856	6,748	3	4	„	5	0

The total imports of foreign stock into London last week amounted to 1,773 head. In the corresponding week in 1856 we received 1,622; in 1855, 4,752; in 1854, 3,999; in 1853, 6,316; in 1852, 4,436; in 1851, 4,277; and in 1850, 5,124 head.

IMPORTS INTO LONDON LAST WEEK.

FROM WHENCE.	BEASTS.	SHEEP.	CALVES.	PIGS.
Rotterdam	64	528	106	—
Harlingen	149	833	18	—
Schiedam	46	—	—	—
Antwerp	—	—	29	—
Total	259	1361	153	—

YEARLY COMPARISON OF WEEKLY IMPORTS.

	BEASTS.	SHEEP.	CALVES.	PIGS.
1856	499	919	204	—
1855	859	3555	238	—
1854	1130	2593	269	7
1853	1136	4698	462	20
1852	235	3782	419	—
1851	607	3155	363	152

We may here observe that great dissatisfaction was expressed, both by the salesmen and graziers, at the large increase in the tolls for stock now levied by the city authorities. The old and present charges we here subjoin:

LIST OF MARKET CHARGES.

	Old charge.		Present charge.	
	s.	d.	s.	d.
Sheep (per score)	0	2	0	4
Beasts (per head)	0	2	0	3½
Calves „	0	1	0	2½
Pigs (per score)	0	4	0	6
Whole pens for sheep, calves, and pigs	1	0	1	0
Horses (each)	0	6	0	7½
Donkeys „	0	6	0	3

This great increase will, if we mistake not, produce a material falling off in the supplies of stock in future: but why *donkeys* should be so highly favoured as to have *a reduced* tollage, we leave others to imagine.

A portion of the unsold stock exhibited in Baker-street was here to-day. Amongst it, we noticed a short-horn, the property of Sir Thos. Whichcote, Bart., which took the second prize of £10. In addition to the Beasts from Scotland already referred to, Mr. D. Maidwell had on show some wonderful Short-horns, over 210 stones, forwarded by Messrs. Wiseman, residing near Spalding, as also some prime animals of the same breed, fed by E. Sheringham, Esq., of Croxford Abbey, Norfolk.

On the stand of Mr. Robert Morgan, we observed one of the most even lots of Beasts ever sold by any one salesman. They were forwarded by the following breeders: Wm. Thomas, Esq., of Holbeach; the executors of the late Robert Cook, Esq., of Rostland;—Fisher, Esq., of Weston, near Spalding; L. Bird, Esq., of Farcet End; W. Hewson, Esq., of Crowland; Robert Leeds, Esq., of West Lexham, Norfolk; Edmund Farrer, Esq., of Sporle; Josh. Freeman, Esq., of Dersingham; John Allday, Esq., of Lolehill, near Birmingham; and from Messrs. Martin, Cooper, Mitchell, Stoddart, Milne, &c., residing in Scotland.

Messrs. Giblett and Gurrier exhibited some remarkably fine animals, fed by Messrs. Milne, Steward, Mennie, Martin, Garden, &c., residing in Scotland, besides some prime breeds from the home-counties.

Mr. William Collins showed some wonderful Beasts, the property of John Hudson, Esq., of Castleacre, Norfolk; Mr. T. Scrivener, of Stunton; W. Brands, Esq., of Great Stace; and Mr. W. Shaw, of Cotton End.

Mr. Thomas Dixon had also a good show of Beasts, fed by the Marquis of Exeter, Sir Thomas Whichcote, Bart., Mr. Duckets, contractor, of Bermondsey, Mr. John Little, and others.

Mr. Vorley's stand was well filled with good symmetrical stock, forwarded by Mr. Sweeton, of Lincolnshire, Mr. J. Seppings, of Norfolk, and Mr. Cooper, of Hilbrae, N. B.

Considering the immense supply in the market, and its unusually fine quality, there was what may be termed a fair demand for most breeds. A few very superior Scots sold at 5s. per 8 lbs.; but the general top quotation for Beef was the same as on Monday last, viz., 4s. 8d. per 8 lbs.

We have before alluded to the general quality of the Sheep; but we must here notice those offered by Messrs. Weall. They were certainly very prime animals, and comprised 20 Downs from Richard Wakley, Esq., of Lawrence End, near Luton, Beds; 70 Gloucesters from Richard Rowland, Esq., of Creslow, near Aylesbury; and several pens from Berkshire, Oxfordshire, and Hertfordshire. At the stand of Mr. Gurrier were some extraordinary Cotswolds, bred and fed by the Messrs. Hewers and others; also some fine half-breds from Mr. Edmonds, together with several pens of good Downs. Some of the Cotswolds realized £7 each. We understand that the latter breed is becoming more generally used for crossing purposes.

Mr. Starkey exhibited 20 very good half-breds, the property of the Earl of Leicester, of Holkham; and 50 from S. Abbott, Esq., of Castleacre. Messrs. Parkinson and Mawer exhibited 5 wonderful Lincolns, fed by Marshall Healley, Esq., of Croft; and some of the same breed, forwarded by R. Everard, Esq., of Fulney-house, near Spalding. There were 6 very fine Hampshire Downs shown by Mr. G. Bullock, bred by Mr. Sharp, of Remenham, Henley-on-Thames. This gentleman took the first prize in the Show-yard.

The total number of Sheep in the market was only moderate. For nearly all breeds the demand was inactive, but without leading to any quotable change in prices compared with Monday last. The best old Downs sold at 5s. 4d. per 8lbs.

Calves were in short supply, and good request, at a further advance in prices of 2d. per 8lbs.

In Pigs only a limited business was doing, at late rates.

The arrivals of Beasts from Lincolnshire, &c., were 3,600 Shorthorns; from other parts of England, 2,800 Herefords, Devons, &c.; from Scotland, 700 Scots; and from Ireland 200 Oxen. The show of foreign stock was very limited.

THE SMITHFIELD SHOW WEEK.

The Smithfield Club Show has fully realized all that was expected of it. The chorus of our song is still the same—it was the best meeting ever known. There was a great increase in the entries of stock, while the animals were generally remarkable for their excellence. These have of late years been the strong features in the progress of the Club. Its influence has tended to multiply the good and to diminish our supply of inferior sorts. There are far more Herefords and Devons than ever. The Shorthorns hold their ground, and other meritorious races come gradually to assert and develope their good qualities. This was especially the case with the Sussex beasts, of which there was a most commendable entry. In fact, no varieties would appear to be getting more into repute just now than this kind, and their distant relatives the Devons. The latter, after having been for some time comparatively in the shade, are regaining their position very rapidly. Individually they nearly always show well, but for some time we have seen them but scantily represented. They are now, however, becoming once more numerically strong. We should question, moreover, whether so many of them have ever been brought into the focus of one meeting, as we have been enabled to count up within this last week or two.

A further proof of what the Club is effecting for an increased supply of the best meat is to be found in the new names on the prize list. The Gold Medal ox at Birmingham, and the best of his breed in Baker-street, was fed by a gentleman who had never previously exhibited a beast at anything beyond a local meeting. The Gold Medal ox of the Smithfield Club was both bred and fed by another who had never ere this entered his name upon the catalogue. It is not all now King, Queen, and Knave—or, Knave, Queen, and King; but we have fresh men, both as breeders and feeders, competing successfully against others that but a few seasons since were held to be almost invincible. Nobody will say but that this is all in favour of that great object the Club has set itself to achieve. At the same time the lesson has been thoroughly learnt. Although we have new men with good animals, we have none such with bad or indifferent. They have taken careful observation of the place before they have ventured to enter it. There was a time when you could the more readily appreciate the superiority of a prize animal from the comparison with those which stood beside him. By this we have no such marked difference. The labours of the judges are yearly becoming more difficult and trying; and many a one of us, who bows at once to their decree, would be likely enough, and with very good showing, to make another choice for himself. The placing of the same animals in Bingley Hall and Baker-street was often at direct variance. Animals passed over one week were the selected of the next, and vice versa. In a word, they were nearly all prize beasts.

As we give in another place a full report on the merits of the several classes, we need not repeat ourselves here. There are one or two especial points, however, that we may touch on. The first of these relates to unquestionably the best animal in the show-yard — Colonel Towneley's short-horn. It now turns out that this cow is *not*, as was supposed, intended for the butcher; but is to be still kept on for breeding. She is, in fact, declared to be in-calf. This announcement has caused considerable discussion during the week. Many contend that such a proceeding is in direct contradiction to the principle of a Society that annually offers a premium to the butcher who purchases to the largest extent in the yard. Others, again, maintain it to be a triumphant vindication of the Towneley theory, that, let stock be ever so fat, if they be only of the right sort, they will still breed. As a rule, though, we imagine that it would be rather dangerous to adopt a practice that goes to say the best way to prepare an animal for breeding is to feed her up for a fat show. In verity, if this continues, the line between the show of "the Royal" and that of the Club will be a distinction without a difference. But the matter is not to rest here. Mr. Badham, of Suffolk, has declared his intention of moving, at the next Meeting of the Members of the Smithfield Club, that heifers or cows in-calf be not allowed to enter at the Christmas Fat Show; but that spayed heifers and martins be admissible. At present it seems, that the two latter are excluded. Another mooted question was that touching Mr. Heath's polled Scot, which was disqualified at Poissy as being a cross, and not a pure-bred animal. With praiseworthy resolution to have the charge thoroughly sifted, Mr. Heath reserved the animal for this Meeting, where he takes the first premium of his class against a well-known Scotch exhibitor. Surely this should settle the case. If Mr. Heath has fairly won at Smithfield, he is as clearly entitled to his place at Poissy. But he goes further than this. He has challenged his opponents to the proof, yea or nay; and none is forthcoming! During the week his friends have circulated a pamphlet containing the particulars and correspondence, which is unmistakeably all one way. A number of breeders and experienced judges have also signed a paper declaring that the beast looks like a pure Scot. Of itself however, this goes for little or nothing. An animal may to all appearance look thorough-bred, without actually being so. Some of the seemingly best Short-horns at Birmingham last week were prevented from competing because their pedigrees could not be proved. We think, indeed, that Mr. Heath has clearly won his cause without the aid of such evidence as this. At the same time it is only right to say that the Editor of the *North British Agriculturist*, in his paper of this week, calls the *Times* to account for even now recording the beast as a pure Scot; and declares "the Jury at Poissy were furnished with documents which proved that the sire of the ox was a Shorthorn, and the dam a polled cow."

Turning for a moment from the Stock Show below to the Implement Gallery above, we find at once that the crowd is worse than ever. It is almost a question whether, with the present limited accommodation, agricultural machinery can still hold its place here. Despite a higher charge for less space, the entries both of stands and wares appear, naturally enough, to increase. The different articles were positively piled up one on the other, and a purchaser might quite as well buy from hearsay as from what he could see or test under such circumstances. Generally business was complained of as not being so good, although one or two prize firms of the present year drove a very thriving trade.

The week, as we anticipated, was altogether a busy one; and we must hasten to take a brief review of a few of the more important events to be chronicled in its history. The Monday was signalized by the presentation of THE NESBIT TESTIMONIAL, which, with the discussion of the evening, brought together a very large audience at the Farmers' Club. The amount subscribed approached very closely on the handsome sum of three hundred pounds, which was expended in a service of plate, with the appropriate addition of a valuable microscope. Mr. Nesbit subsequently lectured on "the mechanical and chemical principles which should properly regulate the practice of drainage;" the discussion quickly resolving itself into the comparative merits of deep or shallow. The turn appeared to be for some time all in favour of the latter, though a few good men came to the rescue of the four-feet system before the debate concluded. The resolution went to declare that much might be said on both sides; and, more definitely, that depth alone would never control width.

A full report of the Farmers' Club dinner will be found further on. It was satisfactory to see from the Report circulated that the Club never stood so well either in strength, funds, or influence. The Smithfield Club Dinner, of the day following, is also given. We never remember one so well attended; and if the members and their secretary, Mr. Gibbs, will only continue to break out a little beyond their conventional course, as successful a meeting may be annually ensured. What is chiefly to be feared is the stereotyped answer that "we have never done this or that before." In the unavoidable absence of the Duke of Richmond, Lord Berners took the chair, with every right, not merely from his own tastes and success in the pursuit, but as the President of the Royal Agricultural Society.

In this capacity his Lordship also presided at the General Annual Meeting in Hanover-square, on the Friday. This was the first year of bringing forward the meeting a day earlier in the week, and the experiment may be recorded as a successful one. The attendance was far better than usual. A lengthy discussion followed the reading of the report, during which another effort was made by a few malcontents to put the Society and its management in as bad a a light as possible. The number of members were declining—the accounts were badly kept—the country meetings did little good—and so forth. It turns out that the Council, in the exercise of the soundest judgment, have struck off a great many names from their list, who would not, or could not, be made to pay up; and that in really good members—practical farmers and others of a similar character—the Society was never so strong as it is at present. Again, the only auditor present declared that the accounts could not be better or more clearly kept. We have heard the same over and over again from very many quarters, and we believe that in this respect Mr. Hudson and the Royal Agricultural Society might challenge any public body in the kingdom. Then, the country meetings do no good, but only raise a little temporary excitement! We fearlessly assert that if anything has tended to the advance of agriculture it has been these country meetings of the Society. And as to a little temporary excitement, it is well known that the effect of such a visit is never forgotten. The climax to all this came in a proposition bodily put, that all meetings for the future should be held in London! If any man wished to destroy the good of which such a society is really susceptible, he could name no other so suicidal a proceeding.

Still, in some minor matters let the Council take heed. For instance, let the Professors hand in their lectures for publication immediately on their being delivered; allow the Press to report the proceedings of the weekly meetings although we by no means pledge ourselves to record all that is said on these occasions. The fact is, and there is no denying it, that some people go here merely to advertise themselves. They even find fault in the furtherance of so laudable an object. Let us never forget what Mr. Acland said at Salisbury, when a very similar exhibition to what was witnessed on Friday took place:—"The Council should be careful to notice whence complaints really emanated. They were too often, with some people, but the excuse *to make for themselves a little petty importance, or to indulge in the opportunity of delivering a fine speech.*" How true all this is, many who were present at the meeting here will need not to be told. Let those who were absent picture a man without position or any authority as to what is going on, self-electing himself patron of the proceedings—greeting every sentence he approved of with an isolated "Hear, hear," and smirking and nodding at every speaker, lord or commoner, who got up. Assurance, no doubt, is a very fine thing, but surely it has some limit. Again we say with Mr. Acland, let the Council be careful to see from what quarter these complaints come.

The other meetings included one on the Thursday at the Freemasons' Tavern, when Mr. Halkett lectured on his new process of ploughing by steam. We shall return to the subject at some length hereafter, and to the pamphlet he has just issued —the fourth or fifth during the week on things agricultural. On the Wednesday evening, clashing as usual with the Smithfield dinner, the Society of Arts announced the reading of a paper "On the progress of the agricultural implement trade during the last twenty years." Fortunately, as it would appear, we were prevented, for the reason just given, from hearing this effusion. Our contemporary, *The Gardeners' Chronicle*, in manifestly a most charitable spirit, declares it to have been "a rather tedious account, deficient in point and interest." We have since had an opportunity of seeing the paper in the Society's "Journal." It seems to us to be a clumsy attempt to puff certain manufacturers, and as awkward a one to ignore others. So palpable was this, that a member rose on the first opportunity, to protest at the unfairness of such a course, and to name firms which had been excluded in so extraordinary manner from notice. Mr. Caird the chairman of the evening, at once stopped this, as out of order! But, in doing so, the honourable Member for Dartmouth must have surely forgotten the first duty for which a chairman is elected at all—to see and ensure fair-play.

Further than this, we can leave the prize lists and such reports as are worth giving, to speak for themselves. As a whole, the week's result must be regarded as a most encouraging one for agriculture. All the Institutions devoted to her cause are doing well, for the farmers themselves are taking more and more interest in them. In such hands would we cheerfully trust them. What is chiefly to be feared and guarded against is the interference of empirics and charlatans—whose only object is to create disaffection, and float themselves upon the troubled waters they may have raised. With Mr. Acland we say, once more, beware of them!

REVIEW.—MR. GIBBS' HISTORY OF THE SMITHFIELD CLUB.

Very nicely timed to the occasion, and in fulfilment of a promise made some time since, Mr. Brandreth Gibbs gives us his history of the Club. It is very well done. There is no attempt at fine writing; but with the best taste the author strings the facts before him together in plain wholesome English. It is, in fact, just the style for such work. The value of the essay, moreover, is made to depend essentially upon matter which Mr. Gibbs found at his command in the chronicles of the Club. From this he extracts and condenses with much judgment; while from the same source he is enabled to compile several sets of tables that will always have a value in the way of reference, and an interest for those at all taken with the pursuit upon which they turn. It is satisfactory to feel that this history could not have been in better hands.

Without in any way attempting to follow Mr. Gibbs through the succession of eventful changes that have characterized the progress of the Smithfield Club, we may still avail ourselves of a few points that at such a season must be more than usually acceptable. In the first place, then, as to its origin:—

"The national society now known as the Smithfield Club was instituted under the title of the 'Smithfield Cattle and Sheep Society,' Dec. 17th, 1798. Mr. J. Wilkes, of Measham, Derbyshire, the founder, and several other well-known agriculturists, assembled for its formation on that day, being the great Smithfield market-day before Christmas. The late Francis Duke of Bedford occupied the chair. There were also present, Lord Somerville, John Bennet, the Earl of Winchelsea, John Westcar, Richard Astley, John Ellman, Arthur Young, and twenty one others. Later in the same day eight more members, including Sir Joseph Banks, were added."

In some twenty years from this time the Club was supposed to have accomplished all it had aimed at achieving. Arthur Young had not only resigned the secretaryship, but had withdrawn entirely from the Club. The support of the country had not been afforded or continued to that extent the members expected. Accordingly, in December, 1821, the Duke of Bedford, the then chief patron and prop of the Club, not only retired, but at the same time discontinued the handsome sum he had for years been in the habit of giving in premiums. His Grace's letter in announcing this determination is rendered chiefly memorable by the following passage in it:—

"The advantages which, on the first formation of the institution, we held out to the public have been amply realised, and that any further incentive to improve the breeds of cattle, sheep, and swine, *is become wholly useless*. The only object was to increase the animal production of the kingdom, and this object has been fully attained. The markets of the metropolis and throughout the kingdom are abundantly supplied; the best and most profitable breeds of cattle and sheep have been brought into notice, and have made rapid and extraordinary progress in the estimation of the breeder and grazier."

Fortunately the other members did not fall in with the Duke's opinion; but struggled on. The very next year the judges pronounced the Show to be one of the best ever witnessed. And, in short, the Club has never done so much good as from the time its President declared the incentive it offered to have become wholly unnecessary. If he could only have lived to see one of our gatherings of this present day! But the Bedford title is still one that will ever have a high place in the records of the Smithfield Club.

What a common, everyday question it is to be asked "Which is our best breed of stock?" "Which have really done best at our public shows?" And what answers you have, turning of course on the bias or prejudice of the authority you consult! Thoroughly independent of rank or person, let the Club itself for once stand as Sir Oracle:—

"The short-horns (oxen 10, cows 16) have won		26	*gold medals*		
The Herefords (oxen 9, cows 1)..	„	10	„		
The Devons (oxen)............	„	3	„		
Cross-bred (cows)	„	2	„		
Whilst in the general *prizes*—					
The Hereford oxen have won		185	*prizes*	£2758 2	
„ cows	„	22	„	231 0	
					£2989 2
The short-horn oxen	„	82	„	£1399 5	
„ cows	„	92	„	1132 15	
					£2582 0

"The result obtained is that the total number of gold medals is much in favour of the short-horns. This is chiefly owing to the short-horn cows having won the greater proportion of them. On the other hand the number and amount of general prizes are vastly in favour of the Herefords, their principal winnings having been in the oxen and steer classes, while the short-horns owe the fact of their approaching the Herefords at all, in total amount of winning, to the success of the short-horned cows."

Complete lists of all the gold-medal animals are given, for sheep and pigs as well as cattle. The most interesting deductions obtained from weighing the stock are recorded. The several alterations and additions to the prize sheet are methodically dated; and the names of all those noblemen and gentlemen who have ever taken an active part in the administration are classified in accordance with the offices they have filled. Information of this kind was much wanted; and we can well understand, while meeting but just once a year, "how little was generally known by the members of the History of the Club." For their especial benefit has their secretary thus employed himself; and to them, with his Grace the Duke of Richmond at their head, is his work dedicated. The offering, we repeat, is a most acceptable one. For agriculturists in general, however, it contains so much interesting information as to necessarily demand for it a circulation far beyond the few hundred members, over which it appears the Club has never extended.

BATH AND WEST OF ENGLAND SOCIETY.

An important monthly Council meeting of this Society was held, on Saturday, Nov. 28, at Waghorn's Railway Hotel, Taunton, John Sillifant, Esq., of Coombe, Crediton, in the chair. There were also present—Messrs. W. Porter, J. E. Knolly's, W. E. Gillett, T. D. Acland, J. Hooper, J. Gray, C. Gordon, J. Widdicombe, R. Smith, R. Dymond, G. Poole, D. Adair, R. K. M. King, W. Thompson, E. Vidal, M. Farrant, T. Danger, W. Wippell, R. May, J. Fry, H. G. Moysey, J. Belfield, J. D. Hancock, T. B. Morle, S. Pitman, J. Gould, &c.

APPOINTMENT OF VETERINARY INSPECTOR.—The report of the committee appointed to consider the subject of the Veterinary Inspector was brought up and discussed. The committee represented that the services of Professor Brown had been retained on behalf of the Society in this department for the forthcoming meeting at Cardiff, in 1858; and the selection appeared to meet the unanimous approval of the Council.

THE IMPLEMENT PRIZES.—Mr. Knollys presented the report of the committee, to whom the preparation of the implement prize sheets for the ensuing year had been entrusted. A report was presented with the implement schedule at the last monthly meeting, when the list was referred back for further consideration, and the same as now revised was received and adopted.

THE MEETING OF 1859.—A deputation from the inhabitants of Bridgwater attended with a view of urging upon the attention of the Council the great facilities presented by that town for holding the annual exhibition of the Society in 1859. In reference to this subject a communication was read from the promoters of a public meeting at Barnstaple, which, it was stated, was attended by the leading inhabitants and many of the influential landowners and leading yeomen of North Devon, called for the purpose of securing a proper reception of the Bath and West of England Society there, should the Council think fit to select Barnstaple for the site of the meeting of 1859. Mr. Smith, on behalf of the latter place, mentioned that active measures were being taken by the tradesmen of the borough and the agriculturists of the vicinity to give the Society a reception in every way worthy of its high character and importance. The decision of the question was, after some discussion, deferred to a future meeting.

TERMS FOR THE CULTIVATION OF LAND IN THE WEST OF ENGLAND.—The question as to the desirability or otherwise of the Society taking steps to secure a form of covenant between landlord and tenant, better adapted to the advanced condition of agriculture in the West of England, has been several times before the Council, and it was again introduced to-day, when, after a lengthened discussion, it was resolved on the motion of Mr. Charles Gordon, seconded by Mr Knollys, "That a committee be appointed to consider whether the Society may, with advantage, prepare some suggestions of terms for arrangement between landlord and tenant for the cultivation of land in the West of England, which may be suitable to the advanced state of agriculture, and to consider other subjects connected therewith, which may tend to promote its further progress."

THE CARDIFF MEETING.—Two members of the Council —Mr. Jonathan Gray and Mr. J. Widdicombe—were authorised, on behalf of the Preliminary Committee, to enter into the various contracts necessary at the meeting at 1858, and requested to report the same to the Council Meeting in Januery.

NEW MEMBERS.—The undermentioned gentlemen were elected members of the society: Mr. Frederick May, *Courier Office*, Taunton, Somerset; Mr. Winter Gibbs, Taunton, Somerset; Mr. Frederick Knowles, Wrington, Somerset; Mr. Williams, Barnstaple, Devon; Mr. Francis Trood, Netherexe, Devon; Mr. T. Goldie Harding, Halsannery, near Bideford, Devon; Mr. C. Roe, Lynmouth, Devon; Mr. W. Hemming, Coldicott, near Moreton-in-the-Marsh, Gloucestershire; Mr. H. Entwistle, Llanbethian, Cowbridge, South Wales.

THE TRIALS OF THE STEAM-ENGINE.

SUGGESTIONS SENT BY IMPLEMENT-MAKERS AND JUDGES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—I beg to acknowledge the receipt of your letter respecting "Certain correspondence from the Royal Agricultural Society, on the subject of Steam-engines," which you are publishing, and think your offer to contributors most liberal and fair. I did not give any opinion in the matter of the society's circular, but being very much dissatisfied with the trial of implements at Salisbury, and hay machines in particular, I took the opportunity of addressing the secretary on it, and beg to enclose a copy of my letter to him. I know not whether it may have any result with the implement committee. I leave it with you to do as you please, and should be glad to have the name of your agent in Bury.

I am, Sir, your obedient servant.

W. WYATTS.

Hardwick House, Bury St. Edmund's, Nov. 25th.

TO THE SECRETARY OF THE ROYAL AGRICULTURAL SOCIETY.

SIR,—I have been favoured with your circular to the Royal Agricultural Society's implement exhibitors, together with a minute of the society's council, "inviting the respective opinions of its implement makers in reference to a revision of the conditions affecting the construction of steam-engines and other machinery to be exhibited for trial next year," the importance ot which has been brought to the attention of the council by Messrs. Shuttleworth and Howard.

I am not able to give any opinion on this subject, not well knowing the existing conditions or their bearing. I hope, however, if they are revised they will not become more exclusive by it. But, Sir, I am anxious to address you and the committee on a part of the society's affairs, of not less importance to a certain class of its exhibitors, and I hope I may be allowed to do so on this occasion.

I wish to draw attention to the defects of the rules and management under which competitive trial of field implements for prizes is conducted, and under which, I respectfully submit, that general improvement and "fair trial" contemplated by the society is not attainable.

To be brief in explanation, I refer to my own work. I entered a hay machine for competitive trial at the meeting in July last, under the impression that all field implements would be severely tested as to their weight and resistance to draught. I had found the best modern hay machines heavy in these respects, and thought I could improve on them, simplifying at the same time. My implement is original in all its parts and adjustments, the work of years under private trial. I reduced the working parts thirty-seven per cent. as compared with the machine that took the first prize at Salisbury, and reduced from forty to fifty per cent. in weight as compared with that machine, without giving up strength. The difference as to the resistance I had no means of knowing. I made other important improvements, which practical men thought worth a patent. If my work had any merit it went for nothing, from a defective mode of trial. To my great disappointment there was no test of the weight, or of the power required to draw any implement whatever. There was nothing about it in the rules or in practice. I consider this a very great defect, and that those tests ought to be the ground-work of the trial in all field implements. Practical farmers know it is of importance whether any particular implement is seven or twelve hundred weight. Whether it may be drawn by a pony or from its weight or principles of construction, it may be too much for a heavy horse, but they can draw no information on those points from the society's prize trials. They are left to find it out in their own fields. I wonder at this. The judges walk in the dark with the rest. They draw no light from the rules, which ought to guide them. The worse machine may do its work as well as the best at such a trial. The only way to inventive improvement or excellence is shut up, and competitive trial does more harm than good.

Another great defect at the trial of hay machines and horse rakes at Salisbury was, the insufficiency of ground for them. I suppose this was the fault of management. I think this also ought to be subject to some rule. The ground was only enough for two implements, instead of ten or twelve. Marking out a piece for each was not attempted, it was not practicable on half an acre. Once or twice up and down the piece was all that could be afforded, one machine throwing the grass in on the ground to be gone over by the next, the horses often trotting rather than walking, which would disqualify under proper rules. I have been working these machines for thirty years, and have brought some experience to their use and construction, and I assert respectfully that their merits and capabilities respectively are not to be brought out in this way, and that I consider the trial of them at Salisbury unworthy the Royal Agricultural Society.

It is my wish to address this to the proper quarter, with a desire only of fair play, and the general improvement, my interest otherwise being little affected. I think I have pointed out faults, and that they are most easy of cure. I hope, therefore, you will think the subject worthy of being brought before the committee, and hope also the decision on the question to be soon before it on steam-engines, &c., may be made known to the society's exhibitors.

I am, Sir, &c., &c.

W. W.

To James Hudson, Esq.
October, 1857.

I received for answer that the above would be laid before the committee, which was to meet on the 3rd of this month.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—In common with other exhibitors, we were requested by the Council of the Royal Agricultural Society of England some time since to furnish them with our opinion, and to offer any suggestions we might think advisable upon the method employed to test the capabilities of the different implements exhibited at their annual shows. A variety of circumstances caused us, quite unintentionally, to overlook the prescribed period for doing so; we, therefore, take the liberty of offering a few observations on the subject, trusting you may find them of sufficient importance to give them a place in your valuable columns.

The first remarks we have to make will be upon portable engines. It is unnecessary for us to remind you that the primary object the Council had in establishing prizes for them was by testing the engines of various makers to be in a position to guide the decision of farmers and the public as to which were the most serviceable, and the best adapted for the purposes of a farm, and therefore most fit to be placed in the hands of an ordinary farm-servant. So far so good; but the annual testing of these engines, and the great stress laid by the judges upon the consumption of coal induced all the first-class makers to depart from the ordinary commercial engine they were in the constant habit of making, and to construct one whose especial purpose would be to effect that economy without regard due to other points—such as simplicity of parts, strength of construction, &c., so that the trial engine would bear about the same likeness to its commercial brother in point of simplicity that a chronometer would bear to a common watch. Tubes were multiplied to three or four times the surface of an ordinary engine, their thickness reduced to 16 to 18 in. wire gauge, and the spaces between them to ⅜ or ½ in. Further expansion valves were introduced as well as water-heaters, and all this for the simple object of economizing the fuel in the hope of securing the society's prize. This description of engine we have known to cost the makers £200 more than the ordinary kind, while this large expense has been incurred not to produce a more serviceable engine, not to produce a stronger one, not to produce one more calculated fcr the work of a farm, but an engine that might save a few pounds of coal per day; while from the delicacy of its adjustments, its extreme complication, and number of parts, increased number and slightness of tubes, and diminished water-spalls rendered it much more likely to derangement. The effect of this decision is, that the farmer says to the Royal Society, "Gentlemen, let me know which is the best engine." The Society answers, "So and so's is the most economical engine;" and therefore the prize one, and the unfortunate farmer buys an engine from these makers which has nothing in common with the prize engine except a boiler, a cylinder, and travelling-wheels. For these considerations, therefore, it is that we think that most of the observations made by the different makers to the Royal Society miss the mark, and that their attention should be directed to ensure a supply of fair commercial engines rather than to the details of the trials, which we consider to have been performed with the greatest care and exactitude by the judges. As a remedy for this serious difficulty, we beg respectfully to suggest whether the Royal Agricultural Society of England could not cause each maker or exhibitor of engines to sign a declaration to the effect that he the exhibitor on his honour declares the engine entered to be a *bona fide*, fair, commercial engine, that the evaporating surface amounts to — feet per horse-power, that there is no water-heater, nor extra expansion valve, and that he is ready to supply an engine similar in every respect to any purchaser at his catalogue price. On the other hand, if the Royal Agricultural Society of England can prove that a false declaration has been made, the Society after investigating the circumstances shall prohibit him from ever exhibiting at any of their future shows. We do not think that the society should take upon itself to lay down certain propositions for boilers or steam-engines, as that would have the effect of preventing any further improvements; but we do think they should take every possible means of preventing a racing engine being entered; and we would further urge that in case of any departure by the maker or makers from their ordinary engine, such improvements should be described in their declaration, and they should be able to add that for the future they mean to construct all their commercial engines with such improvement or improvements. We have said before that we have every confidence in the correctness of the trials; we should, however, suggest that the coal, of whatever description used, should be broken up in lumps the size of walnuts, and screened free from dust, and that it should be afterwards weighed out to the different competitors.

Respecting the trial of steam-thrashers, we have only one observation to make, viz., that we should suggest the weighing of the sheaves to be thrashed instead of counting them, as it is well known that the same field very often varies 25 per cent. both in the length of the straw and in the quantity of grain yielded; and, after all, the surest test of the working of a thrashing-machine is the quantity of straw passed through it in a given time, and clean thrashed, and not the quantity of grain. We also think that the trials should last during one-half hour for each machine.

With respect to the other machinery trials, we think that the general principles laid done by the Society are sufficiently guarded to ensure a pretty accurate result.

Hoping you will excuse the length of this letter, and that you will have the goodness to insert it in your next,

We are, sir, yours respectfully,

BARRETT, EXALL, AND ANDREWES.

Kates Grove Iron Works, Reading,
Nov. 27, 1857.

TO THE EDITOR OF THE ENGINEER.

SIR,—Your agricultural contemporary, the *Mark Lane Express*, is publishing a series of suggestions made to the Royal Agricultural Society by a number of engineers and implement-exhibitors at the Society's shows, for the future conditions for trials of steam-engines, threshing-machines, &c.; from these suggestions have arisen the remarks which I now beg to enclose you, and shall have pleasure in seeing the same in your scientific columns if you consider them worthy of a place there.

"Adjudication should be represented by points," say Messrs. Ransomes and Sims, and say also Messrs. Garrett and Sons, and Mr. B. Samuelson, in their suggestions to the R.A.S. relative to the forthcoming trials of steam-engines and threshing-machines, at Chester, as published in the *Mark-lane Express* of November 16th; whilst Messrs. Brown and May, John Gray and Co., and Tuxford and Sons, in their suggestions leave out of consideration the question of points altogether. Messrs. Ransomes and Sims, and Messrs. Garrett and Sons, give certain divisions of points, each in the same rotation, with the exception of the third one, which Messrs. Garrett omit. This conformity of views gives evidence of some previous conference or correspondence between those two firms, and hence these points must not be set down as hasty remarks, but as matured ideas leading to some desired result—say,

	Ransomes and Sims.	Garrett and Sons.
1. Durability to count..	20 points	10 points.
2. Simplicity	20 „	10 „
3. Excellence of material and workmanship..	20 „	— „
4. Consumption of coal.	20 „	8 „
5. Portability	10 „	6 „
6. Price per horse-power	10 „	6 „

In reasoning upon this subject of points, we must first ascertain if perfection or any proof positive can be arrived at, as the index to count from: if not, then the system is false, and no satisfactory results can be obtained. With the threshing machine, the straw may be so closely examined as to determine whether it be threshed clean or not, whether it is clean shaken or not, and what power has been absorbed in threshing a given number of sheaves. These and other determinate results may be obtained with the threshing machine, and are true standards upon which to establish a system of points. But with the steam-engine, what in a trial is to determine "durability"? what "simplicity"? what "excellence of material and workmanship"? Such as is sent out from the factory to the purchaser, not that which is merely sent to the agricultural shows?—"Consumption of coal" can be determined, and the power obtainable from a given quantity established; the judicious arrangement of boiler and furnace can be proved by the evaporation of a given quantity of water with a given quantity of fuel, in a given period of time.—"Portability," what is to determine it? Shall simple lightness of construction, at the hazard of explosion, be the guiding star here? or is this to be determined as a quality in combination with something not expressed? And "price per horse power," is it not with engines as with horses?—whether worth £5 or worth £50, a horse is still a horse; or whether inferior or excellent, an engine is an engine. But unfortunately, in the proposed points the superior engine, because more costly to produce, would lose its points; while the inferior engine, through its less price, would count so many points towards a prize!

Here, then, we have amongst all these heads for points but one that can be brought to a determinate result, and that is "consumption of coal;" and is it not upon this result in trials of steam-engines that awards should be made? Is not fuel the *primum mobile* of the steam-engine? and is not the most economical use of it the great desideratum with practical engineers? Will not the excellency of results prove the excellency of the mechanical combinations for producing these results? And does not this simple, clear, and accurately-definable test of fuel, close the door against all charlatanism, and specious reasoning under the cloak of "points;" beneath which garb, engines doing but inferior duty would be brought before the world with first-class reputations? B. C. E.

Nov. 18th, 1857.

A PLAIN FARMER'S VIEWS OF THE NEW THINGS IN AGRICULTURE.

I have, as briefly as I knew how, noticed the steam ploughs lately introduced to the agricultural world. Besides these so-called ploughs, we have various other inventions made to aid in cultivation: these are upon the rotary principle. The only one drawn or impelled by steam, which I have actually seen in work, is Usher's steam plough. This I saw at Carlisle. It is a ponderous thing altogether. A powerful steam engine precedes a large revolving cylinder, or cylindrical framework, upon which are affixed a number of plough bodies, or rather ploughshares in frames; and as each share comes down in contact with the soil, it penetrates or presses into it, and turns over with more or less accuracy a furrow a few feet in length. The slight trial given to it there sufficed to convince me that it was a great waste of power for a very ineffectual purpose. The idea of every share having to descend to enter the soil independently, and turn over a small length of furrow, and then to rise again, and so on in succession, one after another, leaving little strips after the engine, I felt assured must be an erroneous one, and could never be brought into general practice. The result has proved my view correct; for we never hear of it now, so I presume the scheme is given up, or, at all events, laid aside.

One almost wonders what will come next; and to find so much thought, ingenuity, and capital expended upon manifestly erroneous principles, astonishes every plain farmer. I like the plough: it is near perfection: we only want to establish economical draught-power. I believe it will be a long time before it is superseded, even by our friend Mr. Smith; but revolving ploughs around a large drum I don't believe in. Far better, in my humble opinion, is the principle of rotary cultivators, of which, however, I have not yet formed any very elevated opinion. I will now notice some of these very briefly. I have more than once seen Samuelson's digging machine in work. Gibson's I have also seen in work. Both pulverize very well, so far as they go; but it requires the power of four good horses to break up even a less breadth than two feet. Both machines work upon a similar principle — having revolving teeth or forks. Samuelson's are like fork tines, and are made of steel. They revolve very rapidly, and break up the soil to six or eight inches deep, throwing out behind a continuous stream of pulverized soil. Gibson's is a series of cast-iron wheels with strong prongs. These press into the soil, which is pulverized as it is turned up. This machine is, however, better adapted for clod-crushing rather than breaking up the unploughed soil. Samuelson's can more effectually break up such soil, but at a great expenditure of power. The most important implement of this class with which I am acquainted is Romaine's patent steam cultivator. I have not seen this machine in work, therefore cannot offer any personal observations; but from reliable information given me by a close observer who recently inspected it, I am inclined to think there is something really valuable and of considerable utility in the invention. It is the same machine upon which our worthy pioneering friend Mechi some time ago staked, or offered to stake, his agricultural reputation. It is said to "differ from all others hitherto brought before the public for the purpose of applying steam-power to the cultivation of the soil, in entirely dispensing with the use of ploughs, ropes, or auxiliary implements. It is a fourteen-horse portable steam-engine capable of propelling itself, combined with, and giving motion to, a rotary digger." The engine and boiler are carried on a pair of high broad wheels, with two small wheels in front. The large wheels are driven by the engine; the small wheels are used for steerage. By a simple disengaging arrangement the latter are left free when the machine has to be turned round, and by driving one of the large wheels, while the other remains stationary, the implement can be turned completely round within its own length. The cultivating part consists of a hollow cylinder six feet six inches long and two feet six inches in diameter, armed with cutters made of wrought-iron, of sufficient strength to enter the soil. These are separately secured by bolts, and can readily be replaced in case of accident. In work, it takes six and a-half feet, which it highly pulverizes; and it can be turned on the headland in less space than the common plough with two horses abreast. Its daily work is about six acres, at an expense of 35s.; and the depth taken from seven to nine inches. It digs the ground, besides pulverizing it; so that at one operation, it is said, the work of two ploughings and an indefinite number of harrowings is performed, whereby a good seed-bed is obtained. Now, to me, this does seem more like a really useful implement; and if it can be made to do all this work effectively at a moderate cost, it cannot fail to be a great boon to the farming community. I heartily wish Mr. Romaine, the inventor, and Mr. Crosskill, the manufacturer, every success with it; and hope they will soon bring it before the public openly, so that its merits may be well looked into.

Just a word about rotary cultivation. I am a plain man of business, and look to have my work done properly and effectually, so as to save the necessity of resorting to adventitious aids to accomplish my purpose. With a strong iron plough and a good team, I can plough and thus break up *my land* in its driest, hardest state. No cultivator that I have seen can do this. I am to-day, in my latter-seeding, ploughing-in a luxuriant growth of green oats and annuals, which constitute in this most prolific season a regular green manuring. There it lies under the broken furrow, where I hope it will do my crop good service. These rotary cultivators would throw it on the top, making a pretty mess—stopping harrows and drilling, and leaving a most unsightly field. In all cropped lands there are corn roots, stubbles, &c., &c., to be ploughed in, there to rot upon the furrow-sole, to be mingled in the next operation of culture. The rotary cultivators attempt to mix all as they proceed, but don't do it; and the value of rotting roots, stubbles, and other vegetable matter, is chiefly lost or passes away. The mingling must have time, the decaying process must have time, and the decaying matter must be arrested and retained in the soil. I am one of those untidy farmers whose farms will, somehow or other, produce twitch; of course it is indigenous—it grows, it will grow. Well, there it is. My ploughs break it up, in ploughing, in something like order; and it is brought up, in the next process, as a sod or lump, and is easily "picked." These rotators tear it all into bits, which on my cool light soils will never die, and not readily on the heavier portions of my farm; there it lies, forming innumerable sets for future plants. Well, enough of this; for one might go on indefinitely. I must say that I am old-fashioned enough to prefer that old time-honoured implement the plough, in some one or other of its now almost innumerable phases, as the first motive power for breaking up the soil. I like that partial inversion of it; I like that simple, gradual, gliding process of upturning the furrow; I like that simple combination of artistic power so admirably shown in the ploughshare and mould-turner—the gradual lever-lift, the inverted Archimedian screw, gently pressing over the soil at the most acceptable angle. I much question if any implement will ever be invented requiring less draught power in perfecting the same work.

To Mr. Hemming.—I am obliged by your correction. My full conviction still is that fourteen tons was given to me as the weight of the engine, which of course would include water; and I much regret if I have made a wrong statement.

NOTES ON NOVELTIES AT THE AGRICULTURAL SHOWS OF 1857.

THE GLASGOW MEETING OF THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

Of this, confessedly the most successful of all the Society's meetings, the feature which at once claimed the attention of the English visitor was the mode of classification of the implements and machines contributed. For agricultural shows there are two modes of classification eligible: first, according to the kind of work to be performed by the implement or machine; second, giving a certain amount of space to each individual manufacturer, allowing him to arrange his contributions as best he thinks fit. Of these two modes the first is the philosophical; the second, the commercial; and they are to be judged of from entirely different points of view. If the object of the Show is to facilitate the farmer in making comparative observations of the different machines, and to serve some important points in agricultural education, there can be no doubt that the first mode is in every way the best. If, however, it is considered essential to consult the commercial interests of the exhibitor, and, to facilitate his obtaining orders, to create a sale for his wares, the nearer the approach is made to the character of a bazaar the better. It is simply a question between the farmer and the implement maker, as the buyer and the seller, and whether it is politic to study the interests of the one more than those of the other. For purely agricultural purposes it is evident that the first classification is the best; for it is obvious enough that, of any machine which the farmer is wishful to purchase, the more specimens—that is, of different makers—he sees, the better. A thoughtful walk through what may be called the confusion of Salisbury and the well-ordered philosophical arrangements of Glasgow, would have soon made this clear to any one previously doubtful of the truth of the position. Not, let it here be noted, that we are carping at the arrangements of the Salisbury Show—they were admirable, so far as the system of classification adopted admitted of; we simply wish to show that where a farmer was desirous of comparing the arrangements and workmanship of a machine brought out by one manufacturer with those of others, before he could go from one place to another, hunt up specimens, and examine the peculiarities of each, all data for comparative observations would have evaporated from his brain. Few mechanics could effect the object—how could we suppose farmers to be successful? The Judges adjudicating the merits of each implement are not thus expected to wander from stand to stand—at least if they do, their judgment will fail in some particulars; and every farmer would undoubtedly be the better if the shows enabled him to have the facilities of the Judges. It is for the Societies to say how far in this way they wish their shows to be truly educational institutions; nor would this facility of making comparative observations be prejudicial to the interests of the manufacturers themselves. We can easily imagine some, who to crude notions of arrangement add imperfection in workmanship, objecting to this facility of comparison being afforded to the buyers; but we have some difficulty in understanding how those who sell the best machine of any class fear competition. In truth, we do not think that this fear exists amongst our celebrated manufacturers—it is their truest interest and wisest policy to court comparison; at the same time, before closing our remarks on this subject—not altogether without its importance to the agricultural world—it is but right to mention that the system of classification adopted by the Highland Society does entail a hardship on those manufacturers who are desirous to do a trade at the show—as who of them is not?—in forcing them to have either an assistant at each separate department to explain to inquirers *their* machines and implements there exhibited, or, failing this, to allow them to remain unrepresented altogether—an alternative which *no business man* likes to be forced to adopt. This is a grave difficulty, and it is difficult to see how it can be overcome.

As the object of our paper is to take notice of the novelties chiefly at the various shows, not to give a report newspaper fashion, we have under the present division but little to say; for numerous as were the machines represented, many of them either presented the stereotyped features which are seen at each successive show, or where new, have been already described in the first part of our present paper, or in the paper given in the number of this Journal for March last on the Novelties of the Smithfield Club Show. For the purposes of this paper we deem it best, therefore, to take the classification adopted in the prize list as officially announced, and describe the peculiar features of the novelties of such sections as we consider it necessary to notice.

In Section 4 (Subsoil Ploughs for Moor or Strong Land, for three or four horses), Mr. Bentall took the first prize of £4. This implement, although no novelty to the English reader, may be so to some of our Scotch readers; we therefore give a slight description of its peculiarities. One form of it has three shares, preceded by three points, arranged parallel with each other; the centre share and point project beyond the two others, this arrangement enabling the implement to penetrate the hardest soils, and gives it a steady motion. It is mounted on three wheels, by which the depth of the work is regulated: the central beam, to which the centre tine is fitted, has two cross arms, each of which carries a side tine, the side tines having a lateral adjustment given to them as well as a vertical. By this arrangement the distance between the side tines and the centre one is increased or decreased so as to take in a lesser or greater width of land. The width usually covered is 3 feet 6 inches.

In Section 10 (Consolidating Land-rollers), Mr. William Cambridge of Bristol took the first prize of £5 for his patent self-cleansing clod-crusher. This implement has a high reputation in England, and consists of a series of press-wheels on a central bar; each wheel has a slightly eccentric motion on the bar, and the wheels are made alternately large and small.

In Section 28 (Liquid Manure Distributing-Machines), Mr. Isaac James of Cheltenham took the first prize of £4. The liquid in this machine is forced through a distributor, which gives a shower capable of covering from 10 to 15 feet wide. The joints are all waterproof. The valve is prevented from choking by the employment of a double strainer through which the liquid manure is made to pass before it enters the body of the cart.

In Section 29 (liquid manure pumps), Mr. David Falconer, Causeyside-street, Paisley, took the first prize of £2. The arrangements of this pump are simple and ingenious. The two pump barrels, so to speak, are formed of tubes of vulcanized India-rubber, and are made to collapse and extend alternately by the reciprocating movement of a beam.

In Section 30 (straw cutters for hand labour), Messrs. Richmond and Chandler, of Salford, took the first prize of £2. This machine is remarkable for the simplicity of its arrangements, its compactness, and for the excellence of its workmanship. By the use of toothed rollers, instead of the fluted ones generally used in straw cutters, the apparatus is nearly self-feeding.

In Section 41 (root washers), the same firm took the first prize of £2. To the back of the trough in which the cylinder containing the roots to be washed revolves, two curved racks are attached, one at each end. These extend beyond the machine. When the handle of the cylinder is turned in one direction, the cylinder continues to revolve in the trough, washing the roots. When they are judged sufficiently clean, the cylinder is caused to revolve in the opposite direction, when the toothed wheels at the end of the shaft take into the teeth of the curved racks, up which the cylinder climbs, as it were, and delivers the potatoes. When empty, it rolls down the rack to the bearings in the side of the washing trough.

In Section 42 (steaming apparatus), Messrs. R. and W. Smith and Co., of Eglinton Engine Works, Glasgow, took the first prize of £5. This apparatus is exceedingly compact in arrangement, and complete in its details. The boiler is on the Cornish or internal-flue principle, and constructed specially with a view to economize fuel.

YORK MEETING.

This, the twentieth meeting of the Yorkshire Agricultural Society, from its splendid show of stock, and its admirable collection of implements, proved itself no mean rival, in bidding for public favour and attention, to the Royal Society's show at Salisbury. From a good authority we learn that, at the society's nineteenth meeting, last year, £800 in prizes, besides gold and silver medals, were awarded, £200 of this being given for implements alone; the amount of the Royal Society, for the same class, at Salisbury this year, being only £173. The Yorkshire Society had at its show 700 implements—less by 180 only than the number exhibited at Salisbury. While at the latter show 154 exhibitors met, at the Yorkshire show there were no fewer than 93. But in stock the Yorkshire show bore off the palm: for, while at Salisbury there were only 151 horses, at the Yorkshire show there were 177; for 109 shorthorns at Salisbury, there were 100 at the Yorkshire show; while of poultry 220 entries were made, against 156 only at Salisbury. Certainly, this society owes no little to the district in which it is held, with a population of little short of two millions, noted for their enterprise in trade and commerce.

With reference to the implement department of this most important show, the two great features were the competition for the steam cultivation and the reaping machines. For the former the prize was announced in terms which, from their explicitness, contrasted favourably with the announcement for a similar prize competed for at Salisbury—"For the best application of machinery impelled by steam power to the cultivation of the soil, £30." But, still further to remove all doubts as to the comprehensiveness, and at the same time the precision, of the results aimed at, as regards economy of working, the following note was added: "N.B.—It is essential that the operation performed by this cultivator, whether it be disintegration or complete inversion of the soil, be accomplished at less cost than similar or equal results can be obtained by horse or manual power, and that the work be also as well done by the former as by the latter agencies." In competition for this prize, which thus included steam ploughs, rotary cultivators, and digging machines, two entries were made—namely, by the Patent Traction Engine Company (Boydell's endless railway), and by Mr. Fowler. Mr. Fowler's apparatus was not brought forward, so that the only apparatus tried was Mr. Boydell's traction engine. Being engaged at Glasgow, we could not get forward to York in time to witness the trial of this machine. We understand, however, that the work performed by the engine dragging Coleman's scarifier—taking a breadth of 7 feet 9 inches, and a depth varying from 5 to 12 inches—was, on the whole, satisfactory. While working with four iron ploughs, which were afterwards used, the crank of the engine broke, and put an end to the experiment, which, from all we can learn, seems to have been the most successful yet attempted with this form of traction engine.

For the reaping machine prize three competitors entered—Mr. Palmer, Mr. Wray, and Mr. Busby. The machine entered by the latter was that of Messrs. Dray—Hussey's improved, with tipping platform. The principal peculiarity in Mr. Palmer's "Union" reaper is the side and back delivery. This is effected by the use of a radiating platform at the back of the machine; the floor of this platform being composed of a series of rollers, those being of larger dimensions at the outer than at the inner extremities. The two outward rollers have a rotary motion given to them. The attendant, sitting on the machine, uses a rake, with which he draws back the cut produce from the front of the machine on to the receiver board, and the first of the set of rollers. On the line reaching the last rollers, which have, as above stated, a rotary motion given to them, it is taken on by them, and delivered to the ground in a line parallel, or nearly so, to the line of draught. A steel separator precedes the cutters, and, jointed to the side opposite to the working gear, it marks the division in the standing crop between the portion to come under the operation of the cutters and that left for the return of action. While passing over the platform, the corn is retained till it is delivered to the last rollers by a light fence. This is supplied with a roller, which facilitates the passage of the corn over its surface.

The peculiarity of Mr. Wray's machine is, that it is worked with one horse only. The inventor has aimed at making all the parts light, and moving the knife slowly. The knife is an endless one, revolving freely from under the back of the machine.

In the show-yard we noticed one or two novelties only. Amongst these the compact portable gas-making apparatus of Mr. B. Sanders, of Layerthorpe, attracted our attention. Gas can be made by it without much trouble, at the cost, it is said, of 1s. per thousand cubic feet. This, we should think, was an under-estimate. The whole apparatus takes up little room, and its arrangements seem simple enough to be managed without difficulty by any farm-servant. The inventor has fitted up nearly 300 apparatuses in different parts of the country.

On the stand of Mr. Buxton (Malton, Yorkshire) we noticed a patent mill for breaking, splitting, and grinding oats, peas, &c. In this there is an ingenious adaptation of an Archimedean screw in the shaft which carries the grinding part. The screw is immediately beneath the hopper which supplies the grain to be crushed, and carries it to the grinding surface, over which it is distributed at an equal rate, so that if the mill is running fast or slow it cannot choke. The grinding part is formed of a cone divided into three sections; the first of these conical sections is provided with a series of coarse-cut segments, adjustable by means of set screws to fit them for breaking, splitting, &c. The second conical section is smooth in its periphery, but is provided with a series of ribs forming a screw, which carries the substances broken or split by the first cone up to the action of the third and last cone, over the surface of which they are distributed equally by the action of the screw cone. A current of air is also projected over the surface of the last cone, through the medium of the screw cone. The last cone is provided with fine-cut segments, which grind the substances split by the first cone into meal. A 12-inch mill will grind by power from 10 to 14 bushels per hour. The cost of a machine of this size is £12 12s. We understand that the manufacture of this machine has been taken up by Messrs. Richmond and Chandler of Salford, Manchester, whose well-known mechanical abilities will doubtless result in making it a machine of first-class workmanship.

Many of the machines and implements which presented features of novelty were also exhibited at Salisbury; and as we have already described their peculiarities, we have now little more to do, in concluding our brief notice of the Yorkshire Agricultural Society's Show, than to thank the Secretary, J. Hannam, Esq., for so courteously throwing all facilities in our way for inspecting the implements exhibited.—*Journal of Agriculture.*

THE EAST KENT AGRICULTURAL LABOURERS' ASSOCIATION.

Sir,—The vignette of your journal—an able engine, inscribed "*The Mark Lane Express*"—is a happy emblem of the work you have in hand. Deep-draining, long leases, improved machinery, chemical composts, agricultural progress—steps in advance, upwards and onwards—whatever may benefit the soil or its intelligent fertilizer, be he master or man—these are your aim. Your locomotive runs out, and brings back every passing incident of importance to agriculture, without prejudice of matter, distance, or country from whence you fetch your readers' information.

This is the more welcome at the farmer's breakfast-table, inasmuch as there is but little to tempt him out just now. A December morning is seldom pleasant—the "foracre" is so sodden, the air so raw, the fog so solid—as the early rooks cleave it with their wings—our whiskers so wet with the pride of the morning. Almost the only sound to cheer a farmer's heart in December is that which one would, at first, take for a couple of self-hunting puppies, but which proves to be "Yex," "Beam," "Chep," and "Scroad" of the Kentish plough in musical striving and labour together, as the crazy "turn-wrest" comes again to the straining of the smoky team and the crack of the ploughboy's whip.

Will a whistle from behind a Kentish plough interest any of your readers at this time?

Let it be known, then, since country practices differ, that the complete working establishment on a farm, say of five hundred acres, in East Kent is five teams, with a man and his mate to each of them. These ploughmen may be occasionally married men, but the majority of them are single. These are "farm-servants" in East Kent, in contradistinction to the ordinary "labourer" on the farm. It is calculated that this class of "farm-servants" in the eastern division of the county alone must amount fully to 5,000. This class has been hitherto mainly without education, and sadly ignorant of the merest elements of that inward hope on which their eternal destiny hinges, when ploughing and farming shall be over for ever.

There are things enough in *this world* that move us! For example, it touches the heart to the quick when, trebly cased in wool and waterproof, warm and snug, dry and well fed, the cold rain beats mercilessly down, and you pass on the road a mere child (one of the 80,000 employed in agriculture in England)—laying in the first seeds of a rheumatic old age, if not of earlier consumption—rook-keeping! Saturated with the storm, he drags one foot after the other, heavy laden with wet earth, to dislodge a sable trio, who only mock his misery and childish struggles by sweeping jauntily over his head, down-wind, and challenging another toilsome pilgrimage to the opposite extremity of the hundred acre field. No shelter for this child—no "tempering of the breeze for this shorn lamb!" His only interlude till the daylight closes in is his little dinner, to be eaten wet and cold; then more rain, and more rooks, till at last his day is done. This tears one's heart-strings. Surely there should be provision for these lads against the weather in every instance.

But this has its end; *moral* evils have no end—their influence is for ever.

With a lively appreciation of this last sentiment, the fact is an unwelcome one, that the class of whom we are now speaking *have been*, for the most part, habitual absentees from the house of God.

Was there any cause for this, operating upon this class more than upon others?

The inquiry suggested itself; and there appeared, on investigation, a long-standing custom upon the farms of East Kent, with some few exceptions, of "baiting" farm-horses on the Sabbath, from 10 to 12 a.m. (the hours of divine service in the morning), and from 4 p.m. (half an hour before the afternoon service is ordinarily concluded) to 6 p.m.

Here, then, appeared at once an insuperable barrier, in the shape of a custom, to the possibility of these 5,000 men and boys worshipping God at all on the Sabbath, if we except a limited number, who, having the "will," found the way by mutual arrangement of relief in Sunday-work.

In October, 1853, attention was first called to the existence of this custom, the injurious tendencies of which were not, indeed, wantonly sanctioned by the farmer, since it had crept insensibly into his establishment as a "custom received from his fathers." The first furrow being turned up, other things long existing—but existing also for the same reason unobserved—came, one by one, to the surface of inquiry. These were met by the immediate and honest acknowledgment of the farmer, and by his willing co-operation in desiring their removal or alteration.

Amongst these may be mentioned—

1. The yearly renewal of service between master and man, so subversive of any mutual interest and sympathy between the two.

2. The usual mode of access to the farm-servant's bed-chamber, viz., by a ladder from without-doors, giving opportunity for nightly excesses and absence, thefts and other irregularities.

3. The want of domestic comfort in the farm-servant's bed-chamber, want of water and washing utensils, of clean bedding, &c., together with excessive crowding in some instances, and commonly two men in a bed.

4. The general absence in farm-houses of any common

room, with a fire and candle in winter, as a place of rest, retirement, or quiet occupation, except the stable and bedchamber.

5. To these may be added the neglect of insisting on some satisfactory character (and especially a written one) on the hiring of farm-servants.

Here were many undesirable things, but all more or less easy of remedy. It was determined, however, to aim first at the reformation of that custom, already noticed, which left such a ready excuse on the lips of every farm-servant for neglecting his religious duties on the Sabbath-day. "I have no time for public worship," said he; "I am called during the hours of divine service in another direction, to feed my master's horses."

Now it gives us real pleasure to record that since the first mooting of these questions, in October, 1853, the willing concurrence of the farmer in effecting a radical change in the hours hitherto observed on the Sabbath on East Kent farms has been more and more afforded. At the agricultural meeting of 1854 this matter, which had been discussed at their previous anniversaries, was again brought forward with an earnest spirit. In October, 1855, a meeting of county gentlemen and farmers took up the question again; and in September of the year following (1856) a still more influential meeting was held at Canterbury, William Deedes, Esq., M.P., taking the chair.

The resolution following was then proposed—

"That this meeting, being desirous of removing every obstacle to the religious and moral improvement of the farm labourers, recommends the adoption, henceforward, of such hours of stable attendance on the Sabbath as shall give every opportunity to farm servants to attend a place of divine worship."

This was followed by 255 signatures, including the names of the leading gentlemen, yeomen, and farmers of the eastern division of the county.

So the movement advanced. It was only necessary to show that time had insidiously engrafted upon Kentish farms customs and moral disabilities at once unnecessary and injurious to the labourer, and right-minded men lost no time in endeavouring to remove the evil.

Yet long custom is not broken through in a day, or even in years. Accordingly the year 1857, the fifth year of the movement, found something still to be done. There were farmers who still held back from an alteration in their hours on a Sunday, in compliance with the prejudices of many of the "servants," who clung to the old system, which gave them a pretext to neglect those holy services of God's house, which a low state of education too often unfitted them to enjoy. When reluctance "to change the customs" manifested itself among the men, it required some moral determination to carry out desirable changes, and to meet it might be some inconvenience, the labour market being barely supplied. Nor was this moral difficulty lessened; if A carried out the system, and not being backed by his neighbour B, had warning given him by his men, who were immediately taken *without a character*.

One remedy alone remained for this—association. If the farmers would agree to act on one and the same plan, and each of them to vindicate the honour of the Sabbath, no difficulty would remain. One more meeting, then, was convened on the 3rd of October last. Mr. Deedes again took the chair. The object of the meeting had the cordial support of Lord Winchelsea, Lord Sondes, Lord Cowper, and other influential persons. The association was proposed and carried, under the name of "The East Kent Agricultural Labourers' Association," and donations were received.

Little more remains to be added, in giving a summary of this movement, than to state that the first meeting of the committee has since been held, and the following advertisement circulated through the county papers:—

"EAST KENT AGRICULTURAL LABOURERS' ASSOCIATION.

"The committee of the above association, having held their first meeting on Monday, Nov. 16, feel it due to its supporters, and those interested in its operations, to lay before them the following statements:—

"1. That the object of the Society is the religious, moral, and social improvement of the agricultural labourers of East Kent, especially the farm-servants.

"2. That the committee have received information of a very encouraging character respecting the closing of farm-stables during the hours of divine service; of the increased domestic comforts now afforded to farm-servants; and of the success attending the establishment of night schools in various quarters.

"3. That, in their opinion, the first and most efficacious means of carrying out their object, above-mentioned, is the *closing of farm-stables during the hours of divine service;* and next to this, *the encouragement of night-schools.*"

The advertisement is then followed by an appeal to the public for support.

And now we have only to congratulate the agriculturists of East Kent and their farm-servants upon the successful commencement of such an improvement upon old customs, as that henceforward farm-service, in the particular above alluded to, shall be no hindrance between a man and his God. We congratulate the labouring class especially that night-schools hold out, in various quarters, the promise to every man who will help himself that he shall not be at a loss to find those who in turn will help him in his search after self-elevation and improvement. Why should it be said, in our day of progress and philanthropy, that any adult of the labouring class is unable to receive the blessings of divine and human knowledge because he is unable to read?

It gives us still more pleasure to learn that inquiries have reached the promoters of this movement from Oxfordshire, Hertfordshire, and Northamptonshire, with a view of themselves advancing, by some kindred movement, the well-being of the agricultural labourer in those counties.

We only trust that many other counties will be found to follow Kent and Norfolk; and that a reciprocal interest of classes, in the welfare the one of the other, will more than keep pace with the scientific and professional advances of the day. In that class of single farm-servants whose special improvement has been agitated in Kent, be it remembered, we see the expanding of that bulwark of our rural villages—the orderly, staid, trustworthy, respectful, and highly respectable "labourer"—the occupier of the neatest cottage—the father of the best-conducted family—the most faithful of servants to his earthly master, because also to his God—the most unvarying attendant at the house of God—one of the corner-stones of an English village.

A KENTISH PLOUGH.

"ENGLISH TRAITS," BY R. W. EMERSON.—Bacon said, "Rome was a state not subject to paradoxes"; but England subsists by antagonisms and contradictions. The foundations of its greatness are the rolling waves; and, from first to last, it is a museum of anomalies. This foggy and rainy country furnishes the world with astronomical observations. Its short rivers do not afford water-power, but the land shakes under the thunder of the mills. There is no gold mine of any importance, but there is more gold in England than in all other countries. It is too far north for the culture of the vine, but the wines of all countries are in its docks. The French Comte de Lauraguais said, "no fruit ripens in England but a baked apple"; but oranges and pine-apples are as cheap in London as in the Mediterranean. The *Mark-lane Express*, or the Custom House Returns, bear out to the letter the vaunt of Pope—

"Let India boast her palms, nor envy we
The weeping amber nor the spicy tree,
While by our oaks those precious loads are borne
And realms commanded which those trees adorn."

The native cattle are extinct, but the island is full of artificial breeds. The agriculturist, Bakewell, created sheep, and cows, and horses to order, and breeds in which everything was omitted but what is economical. The cow is sacrificed to her bag, the ox to his sirloin. Stall-feeding makes sperm-mills of the cattle, and converts the stable to a chemical factory. The rivers, lakes, and ponds, too much fished, or obstructed by factories, are artificially filled with the eggs of salmon, turbot, and herring. Chat Moss and the fens of Lincolnshire and Cambridgeshire are unhealthy, and too barren to pay rent. By cylindrical tiles and gutta-percha tubes five millions of acres of bad land have been drained, and put on equality with the best, for rape-culture and grass. The climate, too, which was already believed to have become milder and drier by the enormous consumption of coal, is so far reached by this new action that fogs and storms are said to disappear. In due course, all England will be drained, and rise a second time out of the waters. The latest step was to call in the aid of steam to agriculture. Steam is almost an Englishman. I do not know but they will send him to Parliament next to make laws. He weaves, forges, saws, pounds, fans, and now he must pump, grind, dig, and plough for the farmer. The markets created by the manufacturing population have erected agriculture into a great thriving and spending industry.

LEICESTERSHIRE AGRICULTURAL SOCIETY.

The annual show of this society took place on Friday, Dec. 4, in the yard of the Bell Hotel, the spirited proprietor of which had greatly enlarged the space appropriated for that purpose, by erecting long ranges of comfortable sheds. The result was that though the quantity of stock was unusually large, there was an absence of all crowding, and the animals of all kinds were inspected with the greatest facility and advantage. Of the quality of the stock shown opinions varied, some thinking it one of the best shows in this respect the society has had, and others considering that there were many rough things sent, which never ought to have appeared in an exhibition. The decisions of the judges of stock too did not meet with universal approval, as they were considered to have leaned too much to bulk, to the neglect of symmetry and quality, and to have passed over unnoticed some of the very best animals shown, amongst others the excellent sheep of Mr. Bradshaw, of Burley. Mr. Wortley of Ridlington showed some very excellent beasts, and was fortunate enough to secure three prizes. Mr. Spencer's sheep were also very good. Almost the only vegetables and roots shown were sent by Mr. W. Carver, of Ingarsby.

LIST OF THE PRIZES.

BEASTS.

For the best ox under five years old, of any breed, open to all counties, £15, Mr. Edward Wortley, of Ridlington. Second prize, £5, Mr. Robert Lynn, of Stroxton, near Grantham.

For the best ox under four years old, of any breed, bred and fed in the county, a silver cup, value £10, Lord Berners, of Keythorpe-hall. Second prize, £5, Mr. Abraham Perkins, of Arnesby.

For the best short-horned ox, fed by a member of the society, £5, Mr. Thomas Wilson, of Knaptoft-hall.

For the best Scotch or Welch ox, fed by a member of the society, £5, Mr. J. E. Bennett, of Husbands Bosworth Grange.

For the best Hereford, Devon, or Shropshire ox, fed by a member of the society £5, Mr. Abraham Perkins, of Arnesby.

For the best fat cow or heifer, of any breed, age, or weight, open to all counties, £10, Mr. Edward Wortley, of Ridlington. For the next best ditto, £5, Mr. William Winterton, of Wolvey Villa.

For the best fat heifer, under four years old, fed in the county, a silver cup, value £5, Mr. Samuel Spencer, of Snarestone.

For the best dairy cow, fed in the county, that has produced a calf, is either in milk, or has been regularly milked twice a day to the 10th of October, £10, Earl Howe, of Gopsall-hall. For the next best ditto, £5, Mr. George Townshend, of Stoney Stanton.

For the best pair of in-calf heifers, under three years old, open to all counties, £5, Mr. Richard Timms, of Braunstone. For the next best ditto, £3, Mr. C. J. Bradshaw, of Burley-on-the-Hill.

For the best pair of heifers, under two years old, open to all counties, £5, Mr. Thomas Ivens, of Lutterworth. For the next best ditto, £3, C. W. Packe, Esq., M.P., of Prestwold-hall.

For the best bull, above ten months, and under two years old, breeding open to all counties, £10, Earl Howe, of Gopsall-hall. For the next best ditto, £5, Mr. Joseph Sharp Spencer, of Higham-on-the-Hill.

For the best bull, of any breed or age, that has served cows in the previous season, £5, Earl Howe, of Gopsall-hall. For the next best ditto, £2, C. W. Packe, Esq., M.P.

SHEEP.

For the best pen (of three) under twenty-two months old, of long-woolled fat wether sheep, open to all counties, £7, Mr. Edward Wortley, of Ridlington. For the next best ditto, £3, Mr. T. H. Simpkin, of Hoby.

By the Right Hon. the Earl Howe. For the best pen (of three) under twenty-two months old, of long-woolled fat wether sheep, bred and fed in the county, £5, Mr. B. Simpkin, of Hoby. For the next best ditto, £3, Mr. William Everard, of Narborough Wood.

For the best pen (of three) under twenty-two months old, of short-woolled or cross-bred fat wether sheep, open to all counties, £5, Mr. Samuel C. Pilgrim, of Burbage.

By the Treasurer. For the best four long-woolled ewes, which have suckled lambs to the 1st of July, 1857, open to all counties, £5, Mr. Joseph Sharp Spencer, of Higham-on-the-Hill. For the next best ditto, £3, Mr. B. Simpkin, of Hoby.

For the best longwoolled theaves, that have been put to the ram, and supposed to be in-lamb, open to all counties, £5, Mr. John Palethorpe, of Harlaxton. For the next best ditto £3, Mr. William Everard, of Narborough Wood.

For the best four short-woolled ewes, which have suckled lambs to the 1st of July, 1857, open to all counties, £4, Mr. Samuel C. Pilgrim, of Burbage.

For the best four pure short-woolled theaves, that have been put to the ram, and supposed to be in-lamb, open to all counties, £3, Mr. Samuel C. Pilgrim, of Burbage.

For the best pen (of five) long-woolled ewe lambs, open to all counties, £3, Mr. William Everard, of Narborough Wood.

PIGS.

In-pigged or suckling sow, or gelt, breeding open to all counties, £5, Mr. W. H. Harrison, Clipstone House.

Boar, breeding open to all counties, £4, Mr. James Marriott, Floore.

Fat pig, under 12 months old, open to all counties, £2, Mr. G. Beale, jun., Frolesworth; 2nd, £1, to ditto.

By Lord Berners.—Fat pig, under 18 months old, open to all counties, £2, Mr. G. Beale, jun., Frolesworth; 2nd, £1, Mr. Wm. Benskin, Rearsby.

HORSES.

By Lord Berners.—Gelding or filly (two years old) *bona fide* the property of a person occupying at least 50 acres as tenant, best adapted to the general purposes of agriculture in the county, £5, Mr. J. E. Bennett, Husbands Bosworth Grange.

By Lord Berners.—Gelding or filly (one year old) as in Class 30, £5, Mr. J. E. Bennett.

In-foal mare, the property of a tenant farmer, best adapted for the general purposes of agriculture, £5, Mr. H. B. Wayte, Peatling.

By Lord Berners.—Foal best adapted for agriculture, the property of a tenant farmer, £3, Mr. John Campion, Sharnford.

By Mr. Thomas Gilbert.—Cart foal by Leicestershire Hero, Young England's Glory, or Derby, £3, Mr. John Campion, Sharnford.

EXTRA STOCK.

Breeding beast shown as extra stock, £5, C. W. Packe, Esq., M.P.

By C. W. Packe, Esq., M.P.—Fat beast shown as extra stock, a silver cup, value £5 5s., Lord Howe.

By C. W. Packe, Esq., M.P.—Pen of three Leicester or long-woolled sheep, shown as extra stock, a silver cup, value £5, Mr. Breedon Everard, Groby.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A MONTHLY COUNCIL was held on Wednesday, the 2nd of December: present, the Right Hon. LORD PORTMAN, Trustee, in the Chair, Lord Walsingham, Lord Southampton, Lord Feversham, Right Hon. the Speaker, Sir Watkin Williams Wynn, Bart., M.P., Sir John V. B. Johnstone, Bart., M P., Mr. Dyke Acland, Mr. Raymond Barker, Mr. Barnett, Mr. Barthropp, Mr. Brandreth, Mr. Caldwell, Mr. Cavendish, Colonel Challoner, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Wren Hoskyns, Mr. James Howard, Mr. Jonas, Mr. Lawes, Mr. Milwood, Mr. Slaney, M.P., Mr. Banks Stanhope, M.P., Mr. Thompson, Mr. Torr, and Mr. Burch Western.

The following new Members were elected :—

Best, the Hon. and Rev. Samuel, Abbott's Ann, Andover
Bowen, Pryse, Shrawardine Castle, Shrewsbury
Brown, Edward, Oaklands, St. Alban's
Butler, John Field, Childerditch Hall, Brentwood
Fry, Thomas, Baglake Farm, Longbredy, Dorsetshire
Gardnor, Captain Thomas, Sea View, Ryde, Isle of Wight
Gibbs, Thomas, Down-street, Piccadilly, London
Graham, Thomas, jun., Abingdon, Berkshire
Hardacre, Richard, Hellifield, Leeds
Knox, Octavius Newry, South-Collingham, Newark, Nottinghamshire.
Locock, Edmund, South Elkington, Louth
Madgwick, William, jun., Alciston, Lewes
Minton, Alfred, Clewer Court, Windsor
Moorsom, C. R., Cotham, Redcar, Yorkshire
Ostler, John Lely, Grantham, Lincolnshire.
Purton, William, The Woodhouse, Cleobury-Mortimer
Sadler, Benjamin Greame, Linen Hall, Belfast
Simpson, Pinder, Hendon, Middlesex
Smith, Henry, Brierley Hill, Dudley
Turner, Edward Rush, St. Peter's Iron Works, Ipswich
Turner, Frederick, St. Peter's Iron Works, Ipswich
Veitch, James, jun., Exotic Nursery, Chelsea
Warner, Henry, jun., Hawkley, Petersfield
Woodford, William, Bidford Grange, Alcester
Yonge, Rev. William, Rochbourne, Fordingbridge.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the monthly report on the accounts of the society, from which it appeared that the current cash balance in the hand of the bankers at the end of the previous month was £153.

EXPENCES.—Lord Portman, as Chairman of the Expenses Committee, made a further report on the progress of the committee in their consideration of the various topics referred to them. He informed the Council, that the excess of payments over receipts on account of the Salisbury Meeting had been considerably reduced by the adoption, to a certain extent, of the recommendations of the committee, and he trusted that a much further reduction would be effected, not only by a steady adherence to economical arrangement on the one hand, but to an increase in the receipts on the other. His lordship concluded his communication by reading to the Council the several details, under each head of recommendation, which the report contained.

PRIZE ESSAY.—Mr. Thompson, Chairman of the Journal Committee, reported the following adjudication in the class of Essays and Reports :

To the Rev. William Beevor, of Cowbridge, Glamorganshire, the prize of £20, for the best essay on the comparative advantages of entering upon farms in spring and autumn, with instructions to the young farmer on his entering at either season.

AGRICULTURAL CHEMISTRY.—Mr. Wren Hoskyns, Chairman of the Chemical Committee, read to the Council a letter addressed to him by Professor Way, the consulting chemist of the Society, dated Milan, the 20th of November last, and tendering his resignation of that office, which the Council accepted, and passed a vote of thanks to Professor Way for his past services to the Society in that capacity. A special committee was then appointed, consisting of the members of the chemical and finance committees, with the addition of Lord Feversham, Mr. Slaney, M.P., and Mr. Fisher Hobbs, to consider of an improved arrangement for the chemical business of the Society.

AGRICULTURAL IMPLEMENTS AND MACHINERY.—Colonel Challoner, Chairman of the Implement Committee, read the following :

REPORT.

The Implement Committee have, agreeably with the instructions of the council, afforded an opportunity to the exhibitors and judges of implements and machinery at the Society's country meetings, during the last three years, of offering any suggestions relative to the construction and trial of steam-engines and other agricultural machinery at the Chester Meeting, and the committee received fourteen communications on the subject.

The committee having taken these suggestions, and the report made upon them by the Society's consulting engineer, into their consideration, beg to make the following recommendations to the Council:—

1. That in steam-boilers the tubes should not be placed nearer to each other than one inch.
2. That the evaporative power of the boiler may, if thought necessary, be ascertained.

   Remark by Mr. Amos.—"This course appears to me to be good only indirectly: for if the combination work well as a whole, and in its marketable form, the Society need hardly look too minutely into details, unless they see fit to do so."
3. That the parts of the steam-engines should admit of being taken to pieces, and their parts, as well as those of other machines, be examined as to mechanical detail.
4. That the coal used in the getting-up of steam be selected and weighed, as usual, under the direction of the judges; and although the Llangennych variety has been hitherto used as a constant standard for marking progressive improvement in the steam-engine, on account of its uniformity of character and absence of smoke in combustion, that the common bituminous coal of the country may be employed in its place, should the judges think proper to adopt it.
5. That the trials of steam-machinery might, in future, be conducted under sheds, should the advantages proposed to be gained by their adoption be considered equivalent to the expense incurred in their erection.
6. That well-tested self-acting breaks be employed in the trials of steam-engines.
7. That the judges be at liberty to employ, as heretofore, any scheme of data or points that may, in their opinion, best lead them to a clear decision on the practical value of any engine or machine.
8. That higher prizes might be given for steam-engines, on condition that the prize-engine in each class shall be lodged in some public exhibition during the period while it holds the prize; and that the maker will supply, in each case, an equal machine at the price stated in his original certificate of entry.

Some of the suggestions offered by the implement-makers to the committee have been found to be either discordant among themselves, or to refer to conditions adopted by the Society at the Carlisle and other meetings; others are connected either with details of practical management in the stewards' and judges' departments, or with questions on which the committee are not at present prepared to offer any recommendations to the Council;—but wherever the committee have found it advisable, they have introduced into the conditions and regulations of the proposed prize-sheet for next year modifications in accordance with the suggestions made to them.

PRIZES FOR IMPLEMENTS—1858.

The committee beg to recommend the following prizes for implements at the Chester Meeting:—

	£
Portable steam-engine, above 8 and not exceeding 12-horse power	25
Portable steam-engine, not exceeding 8-horse power ...	25
Second-best ditto	10
Fixed engine, not exceeding 10-horse power	20
Second-best ditto	10
Boiler for a fixed engine, not exceeding 10-horse power	10
Portable thrashing-machine, not exceeding 6-horse power	10
Portable thrashing-machine, not exceeding 8-horse power, for large occupations	15
Portable thrashing-machine, not exceeding 8-horse power, that will best prepare the corn for the finishing dressing machine	15
Portable combined thrashing-machine, that will best prepare the corn for market, not exceeding 8-horse power	15
Fixed combined steam thrashing-machine, for preparing corn for market, not exceeding 10-horse power ..	20
Fixed combined steam thrashing-machine, for preparing corn for market, not exceeding 8-horse power ..	10
Corn-dressing machine	5
Corn-dressing machine, for preparing corn for market after being riddled and screened	5
Screen for corn	3
Screen for seed	3
Chaff-cutter, for horse or steam-power	5
Second-best ditto	3
Chaff-cutter, for hand-power	3
Second-best ditto	2
Grinding-mill, with steel or stone grinders, for grinding agricultural produce into meal, to be worked by horse or steam-power	10
Grinding-mill, with steel grinders, for grinding agricultural produce	5
Linseed or corn-crusher	5
Oilcake-breaker	5
Oilcake for common cake	3
Bone-mill, to be worked by steam or other power ..	10
Bone-dust mill	5
Turnip-cutter	3
Turnip-cutter, for hand-power	3
Root-pulper	3
Churn	3
Cheese-making apparatus	3
Cheese-press	3

Miscellaneous awards for essential improvements in any of the implements or machinery exhibited—21 silver medals.

Any new implement, such sum as the Council, on the report of the judges, may think proper to award.

Should the Council decide again to offer the prise for the best steam-cultivator, the committee recommend that it be offered in precisely the same terms as last year.

(Signed) C. B. Challoner, Chairman.

CONDITIONS OF THE PORTABLE STEAM ENGINE.

1. One of the portable steam engines must not be more than eight horses nominal power, nor must the diameter of the cylinder be more than 9¾ inches. The one above eight must not exceed twelve horses nominal power, must have two cylinders, and the diameter of each cylinder must not exceed 8 inches.

2. The tubes in the boiler must not be less than 2½ inches diameter, not less than No. 12 on the metal gauge in thickness, nor placed a less distance apart than one inch from each other. The tube plates must be made of either "Lowmoor' or "Bowling" iron, and the "trade mark" of the iron company must be legible on each plate.

3. The exhibitor will be required to furnish to the Society, along with the specification, a longitudinal and transverse sectional plan of the boiler, showing the action of the fire upon the flues, and also to state in writing:—

(a) The thickness and quality of the boiler plates.
(b) The diameter of the cylinder.
(c) The length of the stroke of the piston.
(d) The number of revolutions, and diameter of the crank and shaft, which must be made of wrought iron.
(e) The diameter and weight of the fly-wheel.
(f) The diameter of the driving pulley (which must not be less than 6 inches wide, nor move at a less velocity than 1,600 feet per minute). A second pulley must also be fitted, and which must not be less than 5 inches wide, nor move at a less velocity than 900 feet per minute, for driving chaff-cutting or other machines requiring a slower motion than can be given by the large driving pulley.
(g) The number of horse-power the engine is calculated to work at.

4. The engine must be provided with a good water-gauge, and with a short piece of pipe fitted with a cock, having a thread to fit the ½-inch gas pipe, for the purpose of fixing a pressure gauge.

5. If the engine be worked on the expansive principle, it is desirable that the means used for cutting off the steam be of a simple character. No force-pump must be fitted with more than two valves, and these must be easy of access. If a heater for water be used, it must be so constructed that the engine will work either with or without it.

6. The Society will be empowered to select any of the engines exhibited, for the purpose of driving other machinery under trial, and will pay the exhibitor £1 per day for the use of the engine and a competent attendant during the time the services of such engine may be required.

7. In adjudicating on the merits of the engine, reference will be had to the simplicity of construction and the probable durability of the engine, considered as a whole and in detail, also the portability of the engine, without losing sight of the strength required for safety, the economy of working, and the price.

8. The Judges will be instructed to have the boilers filled properly with water, the steam got up to the working pressure of 45 lbs. on the square inch, the engine set to work for a short time, and then cooled down.

9. The exhibitor will then be required to take the engine to pieces in the presence of the Judges, and withdraw the piston, slide, expansion valve, and pump valves, for examination. Two men will only be allowed to assist in the operation, and the time of taking to pieces and replacing the parts will be noted. When the whole is put together the engine will undergo the trial of working in the ordinary manner, and in accordance with the practice of former meetings. If after trial the Judges should require any one or more of the tubes withdrawn for examination, the exhibitor shall withdraw such tube or tubes.

CONDITIONS OF FIXED STEAM ENGINES.

1. The fixed steam engine must not be more than ten horses nominal power, and the diameter of the cylinder must not exceed 11½ inches.

2. The exhibitor will not be required to bring a boiler, as steam will be furnished by boilers supplied by the Society, but he will be required to fix the engine, also to find the materials for doing so, at his own expense, and in such a position in the Trial Yard as may be pointed out to him.

3. He must also furnish the Society with plans and specifications, fully describing the boiler and fittings that he would supply to his customer with the engine he exhibits, such boiler to possess the capacity of 25 superficial feet of effective heating surface and ¾ of one foot of effective fire-grate for each horse-power of the nominal power of the engine. No

tubes will be allowed of less diameter than 2½ inches, nor thinner than No. 12 on the metal gauge. Also the leading particulars of the engine he intends to exhibit; such as—

(*a*) The horse-power of the engine.
(*b*) The diameter of the cylinder.
(*c*) The length of stroke.
(*d*) The number of strokes per minute.
(*e*) The diameter of crank-shaft.
(*f*) The diameter and weight of fly-wheel.
(*g*) The diameter of driving pulley (which should not be less than 7 inches wide, nor travel less than 1,200 feet per minute).

The greatest attention will be paid by the Mechanical Judges to the drawings and specifications relating to the boilers of the Prize Fixed Engines. Such drawings and specifications will remain the copyright property of the Society; and will be published in the Journal of the Society for the purpose of guiding its members in making their purchases.

4. The engine exhibited must be supplied with a governor, and have a starting-cock to regulate the supply of steam, and be fitted with a thread equal to the 2-inch gas pipe.

5. If the engine is worked on the expansive principle, a simple means must be used for cutting off the steam. No force-pump must be fitted with more than two valves, and these must be easy of access. If a heater for water be used, it must be so constructed that the engine will work either with or without it.

7. In adjudicating on the merits of the fixed engines, reference will be had to the price, simplicity of construction, probable durability of the whole and in detail, and the means provided for easy access to the working parts, and to economy of fuel.

CONDITIONS OF FIXED STEAM BOILERS.—"SPECIAL PRIZE."

The boiler must possess an effective heating surface of 25 superficial feet and three-fourths of one foot superficial of effective fire-grate surface for each nominal horse-power. Clear and concise drawings and specifications, with the cost of forming the boiler-setting, with its flues and passages up to the entrance into a chimney, must be furnished to the Society, for publication, should the Council think fit to publish them.

If tubes are used, none less than 3 inches diameter and 1 inch apart will be allowed; and no tube-plates shall be used which are not made either of "Low Moor" or Bowling iron, and bearing the ironmaster's trading mark. The fittings which the exhibitor supplies must be shown with the boiler, and a guarantee given that he will supply the public with boilers and fittings of a similar description, at the price named, for twelve months certain after the prize has been awarded to the exhibitor.

CONDITIONS OF CHAFF-CUTTERS AND MILLS.

Chaff-cutters will be required to cut chaff three-eighths of one inch in length, in the trial. The exhibitor may provide means for cutting various lengths, to show the usefulness of his production. The Judges will be instructed to use thin slips of wood for determining the length of chaff cut; and if the deviation from the given length of three-eighths of an inch is, in their judgment, too much departed from, they may refrain from taking any notice of the machine in question; and in estimating the *weight* of chaff cut, allowance must be made and taken according to the length of chaff cut.

Grinding mills will be fairly set to work, and their production compared with a sample which the Judges shall cause to be produced by one mill, and which produce shall, in their estimation, be adapted for the farmers' purposes of feeding. The mill under trial shall be "set" until it produces like meal; and the *time*, *power*, and *quantity of work* noted.

Steel mills for grinding will not be expected to produce softened meal, although any mill or combination, with rollers or otherwise, which will do so, will receive consideration from the Judges; but mills of this class generally will be tried and compared in the class as grinding mills with stones are compared in their class.

SPEED AND PRESSURE.

All implements turned by the winch or hand-crank shall not be worked, at any trial, beyond the following speed—namely, 42 revolutions per minute for 12-inch crank, 37 revolutions for 14-inch crank, 32 revolutions for 16-inch crank; and, in addition to the winch-handle which must be supplied with the machine, for the purpose of trial, a pulley not less than 4 inches wide, of the same radius as the winch, must be fitted to each machine. The machine, in its trial, will be driven by the pulley of the testing machine, which pulley is 31 inches diameter, and will make 32½ revolutions per minute.

Chaff-cutting and other small machines, worked usually by horses and by steam power, will be worked, when under trial, by pulleys not less than 5½ inches wide, moving with a velocity of, or about, 900 feet per minute.

Exhibitors are requested to pay particular attention to the instructions given for the speed and working of their machines, as the Judges may refuse to try any machine not fitted in accordance with the instructions.

The working pressure of steam to be 45lbs. per square inch, which must not be exceeded.

The Council adopted this report, and ordered that its recommendations should be introduced into the implement prize sheet for the Chester Meeting, now in the press, and awaiting publication.

Age of Bulls.—On the motion of Mr. Torr, seconded by Mr. Milward, it was decided that the age at which the old Bulls might compete should be raised from four to six years.

Poultry Show.—Mr. Milward gave notice, that at the Monthly Council, in February next, he should move that after 1858 there shall be no exhibition of Poultry at the country meetings of the Society.

Entry Fees and Shedding.—The Expenses Committee having called the attention of the Council to the contribution which, in their opinion, the exhibitors of stock (as in the case of those of implements) should make toward the great expenses incurred for the accommodation of their animals during the show, it was resolved that exhibitors of stock should contribute to the expenses of the yard. It was then, on the motion of Mr. Torr, resolved, "That the charge for all stock exhibited shall be 5s. for each entry, in addition to the 10s. paid by non-members." This resolution was ordered to be added to the prize sheet.

Showyard.—Lord Portman, as Chairman of the General Chester Committee, read to the Council the report of that committee, in which it was strongly recommended that the arrangements for the showyard at Chester should be finally settled by February next; and with a view to enable the council to decide on the arrangement to be adopted, the committee would be prepared by that time to lay before them the plan which the committee would recommend for adoption.

Dinner.—On the motion of Sir Watkin Wynn, Bart., M.P., seconded by Mr. Fisher Hobbs, the Council postponed until their monthly meeting in February the further consideration of the question whether any dinner should be ordered under the responsibility of the society. Mr. Banks Stanhope, M.P., gave notice of the following motion he should bring forward on that occasion:—"That no dinner of the Royal Agricultural Society of England shall for the future take place at the annual country meeting, unless the locality shall guarantee a sufficient number of tickets to defray the expense."

Implement Judges.—The Council decided that it shall be the duty of the Implement Committee, in each year, to report to the Council the number of judges required for the implement department, previously to the meeting of the committee for the selection of judges. The Council resolved not to adopt the recommendation of the Expenses' Committee on the question of the number of the judges of stock.

ORDERS OF COUNCIL.—On the motion of Lord Portman, seconded by Mr. Raymond Barker, the following motion was agreed to: "That it be a bye-law of the society, that no order in council shall be altered without one clear month's previous notice being given to each member of the council."

CODE OF BYE-LAWS.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Brandreth Gibbs, the Council ordered that the bye-laws and resolutions of council, which are now in force, be collected together, complete up to the end of the present year, and printed for the use of the members of council.

VICE-PRESIDENT.—On the motion of Mr. Raymond Barker, seconded by Lord Feversham, Viscount Eversley was unanimously elected a vice-president of the society, in the place of the late Earl Fitzwilliam.

RESPONSIBILITY OF IMPLEMENTS AND STOCK.—On the motion of Mr. Brandreth Gibbs, seconded by Mr. Fisher Hobbs, the following resolutions were agreed to:—

That in future the delivery orders which are now in use for both live stock, implements, &c., be discontinued.

That a clause be inserted in the conditions stating that the society will not in any case hold itself responsible for any loss, damage, or mis-delivery of such live stock or implements, or other articles exhibited at the society's shows.

METROPOLITAN MEETINF.—On the motion of Mr. Brandreth Gisbb, seconded by Mr. Fisher Hobbs, a committee was appointed — consisting of Lord Portman, Lord Walsingham, Lord Feversham, the Speaker, Mr. Barnett, Mr. Brandreth, Colonel Challoner, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Wren Hoskyns, Sir John V. B. Johnstone, Bart., M.P., Mr. Jonas, Mr. Milward, Mr. Thompson, and Mr. Torr—to consider the following subject, and to report their recommendations to the Council, viz., as to how far it will be expedient for the Society to make application to the Royal Commissioners for permission to hold a show, in an early year, on the admirable site which the land lying between the Kensington and Brompton roads, and adjacent to that portion of Hyde Park on which the Great Exhibition of 1851 was held, now offers for the purposes of the Society, if such permission can be obtained.

LECTURES AND MUSEUM.—Mr. Henry Cole communicated to the Council, on the part of the Committee of Council on Education, an offer to the Society, under certain conditions, of the use of the museum and lecture room of the South Kensington Museum. The Council received this communication with an acknowledgment of their thanks.

RAILWAYS.—Mr. Fisher Hobbs called the attention of the Council to the great advantage of obtaining, if possible, earlier decisions from the railway companies of the facilities they are willing to grant to the Society's Exhibitors at the Country Meetings, and the Secretary was directed to enter into communication with the different companies on that point.

STEAM-SPADE.—Major-General Grey transmitted to the Council, by direction of H.R.H. the Prince Consort, a communication addressed to His Royal Highness on the subject of a steam-spade recently invented in the United States. The Council ordered an acknowledgment of their thanks for the favour of this communication, which they referred to the Implement Committee.

The **HALF-YEARLY MEETING** of members was held on Friday last, at the Society's House, Hanover Square. The chair was taken at 11 o'clock by the President of the year, Lord Berners. Among those present were Lord Feversham, Col. Challoner, Mr. Barrow, M.P., Lieut.-Col. Townley, Mr. R. Barker, Mr. Bramston, M.P., Mr. Slaney, M.P., Mr. Badham, Mr. W. F. Hobbs, Mr. Barthropp, Mr. B. Webster, Mr. H. Wilson, Mr. Sainsbury, Professor Simonds, Professor Way, Mr. H. Corbet, Mr. Jonas Webb, the Rev. James Linton, Mons. Trehonnais, Mr. J. C. Nesbit, Mr. Jonathan Gray, Mr. Moore (Wilts), Mr. S. Sydney, &c., &c.

The Secretary, Mr. Hudson, read the following report of the Council:—

REPORT.

The Society has gained since the last half-yearly meeting 150 new members on its list, and consists, at the present time, of—

83	Life Governors,
135	Annual Governors,
908	Life Members,
4074	Annual Members, and
18	Honorary Members.
5218	

The Council have unanimously elected Viscount Eversley one of the Vice-Presidents of the Society, in the place of the late Earl Fitzwilliam.

The funded capital of the Society stands at £9,264 8s. 11d. in the New Three-per-cents. Stock.

Professor Way, the Consulting-Chemist of the Society, having tendered his resignation of that office, which the Council have accepted, a special Committee has been appointed to report to the Council, in February next, their recommendations of arrangements to be adopted for the discharge of the duties of that appointment.

Professor Simonds, the Veterinary-Inspector of the Society, has made his report to the Council of his observations and investigations abroad, on the occurrence and nature of the Cattle-plague on the confines of Poland, Prussia, and Austria; and the Council have transmitted to the Highland and Agricultural Society of Scotland, and to the Royal Agricultural Improvement Society of Ireland, a counterpart of that report. Professor Simonds has also made several verbal reports to the Council on his investigations into the nature of diseases which have broken out in several parts of the country among the cattle and sheep of members of the Society. He has also expressed to the Council his decided conviction of the contagious character of that fatal and prevalent malady pleuro-pneumonia.

The Salisbury Meeting has been one of the most remarkable assemblages of live-stock and implements ever held in this country. Almost uniform excellence distinguished the several classes of the animals exhibited, while the implements were marked by a high degree of simplicity combined with efficiency. The Show itself, too, was one of the largest ever held by the Society, and was attended by a greater number of visitors than on any former occasion. The success of that meeting affords to the Council a well-grounded assurance of the practical value of the Society's operations in carrying out the great national objects for which it was founded; and encourages them in their continued endeavours to render the future country meetings still more effective, if possible, in promoting agricultural improvement throughout the kingdom, without the risk of infringing to an injurious extent on the financial resources of the Society. In order to combine these objects the Council have under their consideration the adoption of several proposed plans which appear likely to lead to improved arrangements in the Country Meeting department. The Mayor and Corporation of Salisbury and the Local Committee co-operated most cordially with the Council in carrying out the details of the Meeting to so successful an issue; and the Members were indebted to the Right Hon. Sidney Herbert, M.P., for the reception he gave them at Wilton; to Mr. Rawlence and Mr. Squarey, for the inspection of their water meadows; and to Mr. Squarey for the interesting lecture he delivered on the occasion, in explanation of their construction and peculiar value; as well as to Mr. Stephen Mills for his invitation to inspect the light-land system of Wiltshire farming, as carried out on his own extensive farms in that county.

The Country Meeting to be held next year at Chester will be distinguished by the unusual amount of Local Prizes placed at the disposal of the Society by the Local Committee of that city, by the triennial exhibition and trial of steam engines and agricultural steam machinery generally, and by the peculiar advantages of its position in reference to railway communication.

The local prizes may be represented by the following classification:—

Cheshire Cheese (made in the district) ..	£420
Dairy Maids and Cheese Makers.........	21
Dairy Cattle	170
Horses	215
Welsh Cattle.........................	195
Established Breeds (not including Shorthorns, Herefords, or Devons).........	30
Sheep (Welsh, Shropshire-Downs, and Cheviots)	230
	£1281

The prizes of the Society for the Chester Meeting are included in the following schedules:—

I.—Live Stock.

Short-horned Cattle	£170
Herefords	170
Devons	170
Cattle of other Breeds	45
Agricultural Horses	130
Dray Horses	75
Other Horses	105
Leicester Sheep	90
Southdown Sheep	90
Long Woolled Sheep	90
Short Woolled Sheep	90
Pigs................................	80
Poultry	119
	£1,424

II.—Implements and Machinery.

Portable Steam Engines..............	£60
Fixed Steam Engines	30
Boiler for a Fixed Steam Engine.........	10
Portable Thrashing Machines..........	55
Fixed Thrashing Machines............	30
Corn Dressing Machines..............	10
Screen for Corn	3
Screen for Seed	3
Chaff Cutters	13
Grinding Mills	15
Linseed or Corn Crusher	5
Oilcake Breakers....................	8
Bone Mill	10
Bone-dust Mill	5
Turnip Cutters	6
Root Pulper	3
Churn	3
Cheese-making Apparatus	3
Cheese Press........................	3
Steam-Cultivator	500
	£775

Miscellaneous awards........21 Silver Medals.

The Prize Sheets, containing the special terms in which these various prizes are offered, the conditions under which the competition for them will take place, and the general regulations for exhibition and trial, are now in the press, and, when finally corrected, will be ready for distribution. The Implement Prize Sheet will include the recommendations of the Implement Committee, in reference to the suggestions obtained by a circular issued, by order of the Council, to each exhibitor in that department, and to each of the Implement Judges, during the last three years.

By Order of the Council,
James Hudson, Secretary.

London, December, 1857.

The Rev. J. Linton moved the adoption of the report.

Mr. Moore seconded the motion.

Mr. Sidney said it would be in the recollection of some of the gentlemen present, that the last occasion on which they had an opportunity of expressing an opinion upon the manner in which the Society's affairs were conducted, was at Salisbury, in the month of July. On that occasion he made some observations in reference to that subject, and all who knew him, he was sure, would believe that in any observations he might make he was actuated solely by the warmest wishes for the Society. Now, he felt that he was perfectly justified in calling the attention of the Council and members to this subject, because, although they had prepared a very flourishing report of the Society's proceedings, they could not help being aware, from the little information which oozed out from time to time, that the finances of the Society were not in so satisfactory a state as could be desired. That fact was proved by the circumstance that a committee, over which Lord Portman presided, had several times investigated the condition of the finances, and that in order to improve them it had been found necessary to recommend the reduction of expenses of a necessary and important character. For instance, just before the Salisbury Meeting, in the summer, the Finance Committee recommended that the services of a number of the judges should be dispensed with, and that the payments made to the yardmen should be discontinued.—[Colonel Challoner: It was not the Finance Committee who did that; it was the Expense Committee.]—But in this instance they considered it so closely, that it appeared a mistake was made; for, when the report of the committee came before other parties more experienced than themselves, the recommendation as to the judges was disregarded. The judges, whom it was proposed to dispense with, were re-appointed; and even then it was found that the gentlemen at Salisbury, who had that business in their hands—notwithstanding all their zeal and industry—were greatly over-worked. If, then, the Society was in such a condition that reduction of expenditure, recommended by a committee, could not be effected with advantage to the Society, it must be evident that something was wanted to be done. They were now in the 20th year of the history of the society. During that period it had doubtless effected great things, and it had held a magnificent exhibition every year; but what was the reason they had not an income sufficient to do largely and liberally all that was required? True, after a falling off in the number of members for a series of years, the tide had turned, and their ranks were beginning to increase. Still there was something that ought to be done which had not been done, for the number of members was much less than it was ten years ago, although agriculture was never in a more flourishing condition than at the present moment; and, instead of a few gentlemen here and there feeling an interest in experimental farming, there was scarcely a parish in England in which some tenant farmer or other had not been carrying out cultivation in a high and improved style (Hear, hear). Now, he believed that, inasmuch as there were 10,000 parishes in the kingdom, there was no reason whatever why, if the society were properly conducted, it should not have 10,000 members. But they had 5,000 members, from whom a large income was derived. Nevertheless, they had only one great event in the year, and that was their annual country show. On those occasions they certainly did bring the world together, and accomplished great things. But, in his opinion, it was not enough to do great things once a-year; and if they glanced at other scientific societies it would be seen that those institutions created many opportunities for bringing their associates together. True, the society had its Wednesday meetings; but all who were in the least acquainted with them knew that, as at present conducted, they were very little better than a farce; for this reason, that no announcement was made of the business to be transacted on those days—a course of proceeding which was condemned by the practice of the other societies of England. It had happened again and again that interesting discussions had taken place at these weekly meetings, and that those discussions were not reported in the journals which circulated among the tenant farmers, simply because it was the absurd and mistaken rule to exclude reporters; while the official report was so meagre, that little information was to be gleaned from it, and very often even that did not find its way into the hands of the public until months after. As an instance of this, let him remind them of what took place last year, when the whole agricultural world being alarmed by the progress of the fatal cattle disease on the Continent, the society commissioned Professor Simonds to go abroad and make a report upon the subject. The learned professor returned home, and read a most interesting paper to us; but it never appeared, though he heard now that it was about to be published. There was no doubt they might command the best agricultural knowledge of the day, if they would only adopt the simple method of announcing what papers were to be read at their meetings, and allowing the gentlemen who represented the agricultural papers to attend and report the discussion. He believed, also, that the adoption of such a plan would create new interest in the society, and largely augment the number of its members. The next subject to which he would allude was the Journal; and he ventured to say that its management had greatly disappointed the subscribers. If they wished to see what an agricultural journal might be made, let them turn to the pages of the *Bath and West of England Agricultural Journal*," which was an admirable work, replete with the most valuable information. The fact was that the management of the *Journal* of the Royal Agricultural Society was entrusted to three gentlemen, and he had never yet known the office of editor conducted as it ought to be when put in commission like the Chancellor's seal. With regard to the prizes which were to be offered at their next country meeting. Cheshire, they well knew, was a dairy county; and it was a curious fact that, although the Society had been nearly twenty years in existence, and had held 17 or 18 country meetings, they had never yet had a trial of churns on a large scale. Three quarts of cream was the utmost they had ever tried; and he had been informed, by persons who kept dairies, that the trial of churns should be conducted on a larger scale in order to be of practical use. He observed that prizes were to be offered at Chester for chaff-cutters, and root-slicers, and other things equally familiar, and for which prizes had been given ever since the Society was established. Now, these implements were just the same now as they were 17 years ago; and he would throw it out for the consideration of the Council whether they had not better strike some of these standard implements off the list, and reserve their prizes for machines in which a good deal was yet to be done before they attained perfection. It would not have been necessary for him to make these observations if they had not followed the practice described at the Salisbury Meeting, when it was said that their Council were elected for life, and elected their successors (No, no). He did not mean to say it was in the charter, but it was, no doubt, practically the case. In conclusion, he said he believed that if they had a larger infusion of gentlemen from the different counties in the Council, instead of continuing on the list a number of gentlemen who could not attend, it would popularise the Society and render it as flourishing as it ought to be.

The CHAIRMAN said it was highly desirable that reports like Professor Simonds' should appear sooner. The sooner they were published the better. He was under the impression that notice of the Wednesday meetings was always given a month beforehand.

The Secretary said the Wednesday meetings were entirely dependent on casual communications. Whenever any communication of importance had been received, notice had been given of it.

The motion for adopting the report was then put, and agreed to.

Mr. RAYMOND BARKER then read the balance-sheet of receipts and expenditure for the half-year ending the 30th of June last.

Half-yearly Account from the 1st of January to the 30th of June, 1857.

RECEIPTS during the half-year.	£	s.	d.
Balance in the hands of the Bankers, Jan. 1, 1857	438	12	8
Petty Cash Balance in the hands of the Secretary, Jan. 1, 1857..	17	1	8
Dividends on Stock	129	14	1
Governors' Life-Compositions	90	0	0
Governors' Annual Subscriptions	569	0	0
Members' Life-Compositions	403	0	0
Members' Annual Subscriptions	1836	5	0
Journal Receipts	161	13	0
Sale of old Catalogues	2	3	0
Country Meeting Receipts:—			
Salisbury	1500	0	0
	£5147	9	5

PAYMENTS during the half-year.	£	s.	d.
Permanent Charges	165	0	0
Taxes and Rates	19	9	0
Establishment Charges*	1221	6	9
Postage and Carriage	26	3	11
Advertisements	14	5	0
Journal Payments	1098	11	7
Essay Prizes	150	0	0
Veterinary Grant..	200	0	0
Chemical Grant	150	0	0
Chemical Investigations	100	0	0
Country Meeting Payments:—			
Chelmsford	461	0	10
Salisbury	525	6	0
Subscriptions, over-paid by Bankers, returned ..	4	0	0
Sundry items of Petty Cash	3	10	11
Balance in the hands of the Bankers, June 30, 1857	989	8	10
Petty Cash Balance in the hands of the Secretary, June 30, 1857	16	6	7
	£5147	9	5

(Signed) THOMAS RAYMOND BARKER, *Chairman*,
C. B. CHALLONER,
HENRY WILSON,
} *Finance Committee.*

Examined, audited, and found correct this 4th day of December, 1857.

(Signed) GEORGE I. RAYMOND BARKER,
WILLIAM ASTBURY,
} *Auditors on the part of the Society.*

COUNTRY MEETING ACCOUNT, SALISBURY, 1857.

DR.

	£	s.	d.
Subscription from Salisbury	1500	0	0
Prizes offered by the Local Committee for Hamps. Down Sheep	120	0	0
Prize offered by M. Dutrône for polled bull ..	5	0	0
Non-members' fees for the entry of live-stock..	146	7	6
Non-members' fees for the entry of implements	26	0	0
Implement-makers' payment for shedding required	614	2	9
Admissions to show and trial-yards	3447	15	9
Sale of catalogues of implements and stock ..	324	17	0
Fines for the non-exhibition of live-stock ..	2	0	0
Sale of dinner-tickets	78	0	0
Sale of Council-badges	3	0	0
Balance, chargeable on the general funds of the Society	345	12	11
	£6612	15	11

CR.

	£	s.	d.
Showyard and trial works, poultry-coops, hurdles, entrance-turnstiles	2580	9	1
Trial-land for steam-cultivators, compensations, water supply, cooperage	231	7	6
Yardmen, fieldmen, clerks, money-takers, door-keepers, catalogue-sellers	217	2	3
Judges of the show	344	0	0
Judges' refreshments	56	19	0
Veterinary inspector and assistant	26	0	0
Consulting engineer	89	9	9
Hire of farm-horses	56	10	0
Metropolitan police	86	4	0
Green-food	139	18	0
Hay and straw	146	19	6
Poultry food	7	18	9
Coals, seeds, manure, and cream, for trials ..	17	18	6
Ropes, bags, padlocks, brooms..	6	4	0
Stationery	20	2	11
Advertisements	128	9	3
Postage, carriage, messengers	24	10	5
Programmes of the meeting	6	2	0

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* Under this head is included the sum of £708 4s. 11d. paid on account of repairs required in the house of the Society.

	£	s.	d.
Prize-sheets, certificates, labels, admission-orders, circulars, railway-papers	£ 149	5	3
Live-stock and implement catalogues	349	2	0
Live-stock and implement award-sheets ..	29	13	0
Prizes of the Society, awarded and paid ..	1594	12	0
Prizes of the Local Committee, awarded and paid	120	0	0
Prize of M. Dutrône, awarded and paid ..	5	0	0
Dinner-contract	200	0	0
Dinner-tickets and toast-papers	2	5	0
Badges for Council, stewards, and judges ..	7	18	9
Official staff, travelling expenses, board, and lodging	17	14	2
Loss on sale of foreign and other coin.. ..	0	19	10
	£6612	15	11

Mr. W. F. HOBBS drew attention to the loss sustained by the dinner of the Society at Salisbury.

Mr. RAYMOND BARKER said that a contract was made for the dinner for £200. The sale of tickets was conducted as usual, but very few persons seemed disposed to buy. Only £78 was received for tickets. It was, however, the most profitable dinner the Society had ever had, because it involved the least loss (a laugh).

After some remarks from Mr. MOORE and Mr. SLANEY, with reference to the annual dinners of the Society,

Mr. SAINSBURY said, he would take upon himself, as a Wiltshire farmer, to state that had the Council erected a pavilion at Salisbury they could have found the Wiltshire farmers flocking to it in a body, and it would, no doubt, have been well filled. The reason they did not go to the Council Chamber at Salisbury was that they considered that they had not been fairly treated in that respect—in fact, they took a little huff (a laugh).

Mr. Bullock Webster proposed, and Mr. Arkell seconded, a vote of thanks to the auditors, which was agreed to; Mr. Barker and Mr. Astbury were re-elected auditors; and Mr. Druce chosen as auditor in the room of Mr. Dyer, who retired from ill health.

Mr. MOORE then addressed the meeting at some length. He complained that the mode in which the accounts were presented to the members was not satisfactory, and suggested that a tabular statement should be prepared of the income and expenditure of the Society from the commencement, together with a statement of the number of members each year. He was anxious, he said, for the adoption of some plan by which the farmers in the different localities might be led to take greater interest in the meetings of the Society. So far as the *Journal* was concerned, he believed it was scarcely ever seen by the majority of the farmers, and that, when they did take it up, they soon put it down in despair. The articles were very valuable, no doubt, to the class of men who could read and understand them, and had produced beneficial effects on the agriculture of the country, but they did not bring home what was wanted to the minds of the agricultural community. By what means that was to be done he left to the consideration of the managers of the Society. In his opinion, too, the Smithfield Club ought to be amalgamated with this society, and the country meetings given up, substituting for them a great annual metropolitan meeting in the summer, and establishing district societies, comprising three or four counties, such district societies to be affiliations of the great central institution in London.

Col. CHALLONER said he rose for the purpose of answering some of the observations of Mr. Sidney, and he thought he should be able to show that the Council had not been quite so idle and so inattentive to the interests of the Society as some persons might suppose. Mr. Sidney had remarked that the number of members was at one period larger than it was at the present moment. Admitting that that was the case, he must observe that as regarded the class of members whom the Council were most anxious to secure, namely, tenant farmers and practical men, the list was never before so numerous as it was then. Soon after the formation of the Society, when members were elected, as it were, by acclamation, he had seen thirty or forty members put down their names all together at a country meeting. But what was the explanation of that? Why, that gentlemen could not attend the dinner without first becoming members. The result was that they used to be constantly writing ten or fifteen letters to persons for their subscriptions without getting any answer It was then quite common for a gentleman to say, "I subscribed at Southampton," or "at Liverpool," as the case might be; "but I am not a member of the society now, and I shall not pay any money." In fact, many hundreds of persons had their names struck off the books because they would not keep up their subscriptions. This was early in the history of the Society, up to the seventh or eighth years, perhaps, of its career. The Council were prepared to give, not only the gross number, but even the separate names of those who were struck off under those circumstances. Mr Sidney said that if they did so-and-so the number of members would be increased to 10,000. It might be so; but they liked to act upon something like certainty, and it was certain that within the last three or four years, or since the number of names was reduced, by the process of striking off, to three or four thousand, they had obtained an accession of a thousand additional and paying members, and he would add that there were less arrears in proportion among the farmers than among the governors. (Hear). It appeared to him that they could not have erred very much in the management of the Society, when the Society had been getting better known and more popular every year, and when there had been an accession of 1,000 paying members (Hear, hear). Again, Mr. Sidney had spoken of the necessity of giving notice of the lectures. He had papers there before him (*The Mark Lane Express*) from which it appeared that in all the reports issued by Mr. Hudson, the Council stated on what day Professor Way or Professor Simonds would deliver a lecture, and these announcements were always forwarded to the *Mark Lane Express*, the *Gardener's Chronicle*, and other agricultural journals; and when Professor Way was ill, there was a special advertisement to the effect that in consequence of his illness the lecture which had been announced would be postponed to a future day. With regard to the Bath and West of England Society, he must observe that it was no uncommon thing for children to outstrip their parents—(laughter)—and if this were the result of energy and vigorous management, it was a feather in the cap of the society in question rather than a reason for condemning the parent institution. With regard to the churns, trials had been made, but it was a very difficult matter. That was his department in the Exhibition of 1851, when he was for upwards of twelve hours in an atmosphere of 83 degrees. His report appeared in the Journal at that time, and since that period there had, he believed, been no very great variation in the different churns. That trial had subsequently proved to be a very correct one, because the same churn—the square American churn, making from 15lbs. to 20lbs. of butter—was found to be the best. With respect to the root-cutters and slicers, he might observe that at the Lincoln Show Mr. Moody brought out a turnip-cutter that was tried thoroughly, and he was so much pleased with it that he immediately bought one. He had procured three of them since, and every gentleman who had seen them at his place had pronounced them the best that they had met with. He would add that their consulting engineer, on being consulted the other day, recommended the Council to offer a reward for turnip-cutters, there not being one that he considered perfect. With regard to the election of the Council, he believed everyone knew that under the Charter of the Society, on a certain day in May the Council for the ensuing year had to be elected. Nothing could be better known than that at the General Meeting in May, the Council and trustees, and the officers of the Society, had to be elected by the members, the fact being made public, he believed, through the medium of all the agricultural papers. Mr. Moore had referred to the accounts. On that subject he would detain them only one minute. Let any gentleman present call for information under any one head of expenditure—be it the chemical grant, be it the veterinary grant, be it the country meetings, be it the establishment charges, he would undertake to find the information in a book which was before him.

Mr. MOORE said he did not for a moment question that the affairs of the Society had been managed in the most perfect manner possible. What he desired was, that a clear statement of the income and expenditure should be published half-yearly in the Journal.

Col. CHALLONER intimated that what Mr. Moore required had been done.

Mr. MOORE said, having examined the accounts published from time to time, he must declare that he could not make out the annual receipts and expenditure. What he wanted was an account of the annual income and expenditure, with the number of members from year to year.

Col. Challoner said, the book before him, and to which he had just referred, was not got up for the occasion, but had existed from the earliest period in the society's career, and within five minutes he could point out the most trivial item in the accounts of any one year.

Mr. Moore was afraid that his remarks had produced a wrong impression. What he meant to say was that the accounts published did not appear to him to furnish a fair criterion of the actual progress of the society from year to year.

Col. Challoner observed that there were arrears in every society, and that it was absolutely necessary to make out the accounts up to a certain day. He concluded by observing that as regarded the proposed alteration in the mode of conducting the society's operations, that was a question the decision of which must be left to the members as a body.

Mr. Astbury, as one of the auditors, felt it his duty to testify to the admirable manner in which the accounts of the Society were kept, and to the readiness with which they had been furnished with every possible information by Mr. Hudson.

Mr. Barrow, M.P., wished to correct an opinion that the Council were self-elected, and were elected for life Under the constitution of the Society, the Council were elected by the members generally. The Council naturally looked around among themselves, in the first instance, to ascertain who had been most useful, by attending the meetings and in other ways; a statement of the attendances was laid before the election took place: this was a guide as to the future. They were always prepared to listen to suggestions as to the election of a new member; and he had repeatedly heard it remarked that one gentleman should not be chosen because his county was fully represented, and that another should be chosen for the opposite reason. He was anxious that the mambers of the Society should have the election of the Council entirely in their own power, and that the right to nominate a new member should not be a mere shadow (Hear, hear). At the last election of the Council there were four-and-twenty members who might have been re-elected; and six of them were passed by, although they were men of high standing, simply because their attendance had not been satisfactory. With respect to the observations made as to the desirability of centralising the meetings of the society, he must confess he was not particularly partial to the principle of centralisation (Hear, hear); and he must say that he thought the travelling of the society from place to place had been beneficial to agriculturists generally. It was remarked that the large attendance at the shows was the result of excitement. He accepted that representation; and he said that if the country meetings led to excitement, there was reason to believe that that excitement produced good effects in the district (Hear, hear). An addition to the number of members in the particular locality was one consequence of holding a country meeting (Hear, hear). He was as desirous as those who had introduced the subject were, that the society should improve and progress, and the Council were happy to hear suggestions from gentlemen whom they had not had the pleasure of meeting at the Council Board.

Mr. Sidney wished to make two practical suggestions. Professor Way, it appeared, had resigned his office; and with all the respect which he entertained for that gentleman's scientific talents, he must say he was exceedingly glad that he had done so. It was absolutely necessary that if that society had a chemist, he should do something for his money. Professor Voelcker had been lecturing for the Bath and West of England Society in various towns; and in his case this had proved very useful. His lectures were on practical subjects; and owing to the manner in which these were brought home to the minds of those who heard them, the attendance of farmers had been very large, and the result very satisfactory. What he had to suggest on that subject was, that in filling the vacancy which had arisen the greatest care should be taken to select the most suitable person, and that arrangements should be made for securing a larger attendance of members.

Mr. Bullock Webster, referring to the Chester Meeting, said he understood that Mr. Holt, the proprietor of Radley's Hotel, was prepared to erect the building at his own expense, provided he received sufficient encouragement from the Council. He would be glad to know whether the Council intended to hold out any special inducement to the inventors of steam-cultivators to send their inventions to the Chester Meeting? Many persons, he understood, were inclined to send them, but not entirely at their own expense.

The Rev. Mr. Linton thought it very advantageous to hold meetings in the country. An opportunity was thus afforded to them of observing what implements were used in other districts besides their own; and he for one, had seldom gone away from a country meeting without having learnt something which he had afterwards found very useful to him in his own county—Huntingdonshire. The Journal had, he thought, been the means of diffusing an immense amount of agricultural knowledge throughout the kingdom. For example, in the very last Journal there was one of the most useful papers he had ever read in his life: he referred to the paper which described a very simple and economical mode of constructing roads on clay-farms, the author of which was Mr. Bailey Denton.

Lord Feversham then moved a vote of thanks to the Chairman. He did not see how any association of that kind, having practical objects in view, and aiming at practical results, could rest on its oars; and he was happy to say there was reason to believe that most of the members of the Council were in favour of progressive improvement (Hear, hear). He had himself proposed in the Council that the Show meetings should in future be held in the metropolis. He did not know whether or not Mr. Moore wished to have country meetings as well as London meetings.

Mr. Moore said he would have three or four counties thrown into one, and have affiliated societies in different parts of the country.

Lord Feversham thought the Council would do well to consider whether it might not be an improvement to hold the meetings in London instead of in the country. Everything he heard with respect to the railways, with respect to the want of accommodation in towns, and with respect to the inconvenience sustained by exhibitors in consequence of having to send their stock to distant parts of the kingdom, convinced him that this view was correct. He was opposed to the amalgamation of the society with the Smithfield Club. He would keep both societies distinct, but would have a large building erected for the meetings of both societies—one in the summer and the other in the winter. His lordship concluded by expressing his dissent from the opinion that the judges should be required to give reasons for their decisions, observing that such an arrangement would lead to great practical inconvenience, while it could produce no useful result.

Mr. Hobbs, in seconding the motion, said he was pleased to find that the members of the society were beginning to take an interest in its proceedings, because he felt satisfied that unless the Council knew what a strong feeling prevailed among the members, the measures which were so desirable for the success of the society would never be carried out. He trusted that during their noble President's year of office necessary reforms would be effected.

The motion having been carried by acclamation,

The Chairman, in replying, said he rejoiced at the observations which were made at the commencement of the meeting, because they had elicited the remarks of Col. Challoner, who was a member of the Finance Committee. He was one of those who thought that there could not be too much publicity as regarded the accounts, and that the entire management of the society could not be too thoroughly ventilated (Hear, hear). It was on that principle that he had always acted in relation to his own farming operations, being convinced that it was the best mode of eliciting the truth and promoting improvement. He could not agree with his noble friend, Lord Feversham, that it was desirable entirely to do away with the migratory proceedings of the society, because in counties which had been most behindhand in agriculture, he had seen not merely excitement for a time, but very great permanent improvements as the result of the country meetings. He admitted, however, that the holding of a meeting occasionally in London would be advantageous to agriculture, and he should be glad, so far, if his noble friend's suggestion could be carried out.

The meeting then separated.

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE ANNUAL DINNER.

The annual dinner took place on the Tuesday evening in the Smithfield Show week, at Radley's Hotel, under the presidency of the chairman of the year, Mr. Owen Wallis. Among those present on this occasion were: Mr. R. Baker (of Writtle), Mr. W. Bennett, Mr. Mechi, Mr. Cuthbert Johnson, Mr. Trethewy, Mr. Wilmot, Mr. Bullock Webster, Mr. Bell, Mr. C. Stokes, Mr. Parkinson, Mr. Coussmaker, Mr. Skelton, Mr. J. Wood (Sussex), Mr. E. Pope, Mr. C. Howard, Mr. J. Druce, Mr. Molyneux, Mr. J. H. Johnson, Mr. Hammond, Mr. Goldhurst, Mr. H. Cheffins, Mr. W. Cheffins, Mr. Tuxford, Mr. Purser, Mr. Pile, Mr. Cutts, Mr. Congreve, Mr. Ward, Mr. Reeve, &c., &c. Mr. Thomas, of Bletsoe, occupied the vice-chair.

After the dinner, which was furnished by the landlord, Mr. Holt, in excellent style,

The CHAIRMAN proposed "The Queen," observing that the throne of England was never occupied by a sovereign who had greater claims to the affection of her subjects.

After a heartily-loyal response to the toast,

The CHAIRMAN said, the next toast was "The Prince Consort, the Prince of Wales, and the rest of the Royal Family." The first of these exalted individuals had been distinguished ever since he had been amongst them as the patron of the arts and sciences, and had done all he could to promote the social and intellectual welfare of his fellow-beings. He was also, as they were aware, a great patron of agriculture. Of the Prince of Wales they at present knew but little, but they induced a hope that he would profit by the example of his illustrious parents, and would prove at some distant day a fit successor to his Royal mother. While the cause of the arts and sciences was well represented by the Prince Consort, the cause of the army and of the national defences was equally well represented by another member of the Royal family, the Duke of Cambridge, who by his speeches on various public occasions had shown that he was as much to be admired for his sound, practical, good sense and his kindness of heart, as they all knew that he was for his daring courage and intrepidity in the presence of an enemy (cheers).

After a due response to this toast,

The CHAIRMAN proposed "The Army and Navy." He said when that toast was proposed three years ago, their gallant soldiers had just won for themselves imperishable fame at the battles of the Alma and Inkermann, and now they had fresh claims to our admiration, arising from the fortitude with which they had undergone sufferings and privations ten times more fatal than the bullets or the bayonets, the shot or the shell, of the Russians (cheers). The army, which had before so much cause for just pride, had recently performed acts of the greatest intrepidity and daring in suppressing the mutiny of the treacherous Bengal sepoys; and though universally outnumbered, they had on all occasions come off the victors. The names and deeds of Havelock and his devoted companions would continue in the recollection of a grateful country. Well might they indulge a hope that Havelock and his forces would be rescued from the perilous position in which they were when last heard of, and that the gallant general would live to reap the reward and enjoy the honours conferred upon him (cheers).

The toast was drunk with the greatest enthusiasm.

The CHAIRMAN afterwards said, the toast which he was about to propose was undoubtedly the toast of the evening, for it was "Success to the Central Farmers' Club" (cheers). It had been customary on that and similar occasions to review their past proceedings, and to examine the present state and future prospects of the club; and whether they looked at the past, the present, or the future, he thought that at no period of its existence had it been in so good a position as at that moment. Three or four years ago it was thought that the club would be broken up. Indeed its downfall was very commonly predicted. He, for one, never paid much attention to these predictions, believing that the club was of so useful and valuable a character that it would ultimately receive that amount of support from the farmers of England to which the objects it had in view so well entitled it. The Royal Agricultural Society brought before them the best specimens of breeding stock, and the implements which were best suited to the increasing wants of the farmer. On the other hand, the Smithfield Club, and other societies of a similar nature, brought before their notice the best specimens of fat animals. But in a society like the Central Farmers' Club, the farmers of England could meet together, and learn how breeding-stock might be best reared; how fattening stock might be best fed; what implements were best suited to their purposes in their respective localities; what manure was most advantageous for a particular crop—how it could be best prepared, and how best applied; how the soil could be most economically and effectually drained; how land which had hitherto been in a state of waste could be brought under successful and profitable cultivation; and last, though not least, how the labourers of England could be best educated, so as to suit the altered circumstances of themselves and their employers (cheers). It was, he said, in societies like that, that farmers met together to learn from each other, by discussing subjects of that nature; and those who from a false economy stayed at home, or took no notice of the matter, would ultimately find themselves distanced in the race which they were all running (Hear, hear). So far from having to mourn over the downfall of the club, they had to rejoice in its daily increasing prosperity. During the year which was now closing, they had elected very nearly the same number of members that they had in two preceding years—by far the three best years the club ever enjoyed—and concurrent with this augmentation in its numbers, the club had greatly increased in reputation and in the estimation of the public. This was manifest from the value of the discussions which had taken place during the past year, and the position and character of the gentlemen by whom they were introduced. Moreover, their financial position also exhibited a great improvement; for instead of their being in debt, as they were some years ago—if they were not in debt at that period, their income was not equal to their expenditure—that state of things was now reversed, and they were actually saving money at the rate of about £50 a year (cheers). He thought he was safe, therefore, in affirming that the prospects of the club were more flourishing than they had been at any previous time during its career. He now called upon them to drink "Success to the Club;" and he would couple with the toast the name of Mr. Baker, of Writtle.

After a fitting response to this toast,

Mr. BAKER said he felt that he was very highly complimented in being selected to return thanks for this toast, more especially as his name had been connected with the toast by their excellent chairman, Mr. Wallis. He was quite sure that the club was very much indebted to that gentleman for the manner in which he had presided over its proceedings; and no one could be otherwise than satisfied with the progress it had made under his superintendence. He hoped he should be excused if he spoke for a moment of himself in connection with the club (Hear, hear). He was one of the first originators of the club; He had been an attentive promoter of its interests from the commencement, and he hoped he should continue so to the end. He saw it in its first infancy, winding along its tortuous way, "dragging its slow length along;" he now rejoiced to see it in its maturity, occupying a position superior to that of any similar institution of the kind in the country (cheers). And how were they to account for this? How were they to explain the fact that that club now formed one of the leading agricultural features of this country; and that, though it did not perhaps occupy so elevated a position as the Royal Agricultural Society, but one of a secondary nature, yet it benefind a larger number of persons than even that society itself? If it were an honour to be connected with any leading society of the country, more especially did he feel it to be an honour to be connected with a society which was so closely connected with agriculture. Of agriculture, indeed, he had always been one of the warmest advocates, and he might say of her in the words of the poet Burns—

> "She found me at the plough,
> And cast her inspiring mantle over me."

He was sure that the most pleasurable part of his life had been spent in the pursuit of agriculture; whether or not his efforts as an agriculturist had proved beneficial to others as well as himself, he must leave it to others to decide. The great object of that society was, like that of the Royal Agricultural Society, to blend science with practice. With this view they had had scientific lectures bearing upon agriculture. How the subjects introduced were treated, it was not necessary for him to state; nor need he remind them how a subject of great importance was treated on the previous evening by a very able member of the club, or of the valuable discussion which followed (Hear, hear). For his own part, he must confess that he had derived very great benefit from the club. He had obtained much information there, which he probably would never have obtained elsewhere (Hear, hear); and, more than that, he had been brought into association with many of the leading agriculturists belonging to different parts of the kingdom. Formerly farmers used to live constantly on their farms, and were hardly ever brought in contact with persons of their own pursuit in other districts; and the associations which that club had produced among the leading cultivators of land was certainly not one of the smallest benefits conferred by it on the agricultural community (Hear, hear). In that club farmers were brought to know each other; each member communicated any important information which he possessed for the benefit of the whole, and by means of the press that information was disseminated throughout the whole of England. He thought, therefore, it might be said that the Central Farmers' club had done its duty, and fulfilled the expectations which were raised with regard to it at the time of its formation. (Hear, hear.) It was as one of the oldest members of the club that he had been selected to respond to the toast. He now called upon them to look forward to its increasing usefulness, more especially in connection with the various political or financial events which might hereafter affect the interests of agriculture. There had of late, as they were all aware, been a great prostration of the monetary interests of the country. It was not to be supposed for a moment that that did not concern them. (Hear, hear.) He believed there was no class of persons in the kingdom who were more affected by the money-laws than farmers were; and, although the question might appear to some present an abstract one, it appeared to him that they ought, as a body, to watch the proceedings of Parliament, and to give their best attention to a matter in which their interests were so clearly involved. (Hear, hear.) They would all, no doubt, be very much surprised and alarmed if it were enacted by the Legislature that the bushel, instead of holding four pecks, should hold five, and that they should still sell at the same price that they did before; they would all, of course, regard that as a robbery of them to the extent of twenty per cent. of their property in corn. That was exactly what was done, however, by the money-laws; and they might depend upon it that, without some change in this state of the law, an act which worked as the present one did would be set aside from time to time whenever it was considered necessary to suspend its operation. The present law was not based on honest and just principles. There were a number of individuals who reaped their harvest at the farmers' expense; and when times of pressure occurred, and a large rate of interest was being exacted from mercantile houses which were in a state of difficulty and dismay, the Government, under the pretence of stopping the evil, stepped in and suspended a law which was not based on a proper foundation. He felt that he was now touching on a question of which he was not master; he had, however, studied the law in some of its bearings; he had foretold some of its consequences, and he would predict that, unless some remedy were applied, farmers would be still more seriously affected even than they had been. As there was a gentleman present who had made the monetary system his special study—he referred to Mr. Bell—he hoped that gentleman would favour them with his views on the subject: more especially as regarded the bearing of the existing state of things on agriculture. In conclusion, he would remark that agriculture, as now carried on in this country, might justly be regarded as a science; and it was as a science as well as an art that it was being carried on, and its present position was not only the strength of our own country, but the admiration of all surrounding nations (cheers). He thanked them most sincerely for the manner in which they had received the toast.

Mr. TRETHEWEY said he rose to propose a toast which he was sure would be well received—it was the health of their excellent Chairman (cheers). In doing so, he felt that the task entrusted to him was, in fact, a very easy one. They had all heard a good deal, of late, about putting the right man in the right place; and he thought they could not possibly have a better illustration of that maxim than they had in the case of their present Chairman. If he were merely addressing the committee, or if he were addressing only those members of the club who were in the habit of attending the monthly discussions, he should feel that it was unnecessary for him to say anything in reference to the merits of Mr. Wallis; but on looking round the room he saw a great many gentlemen who had not had an opportunity of meeting the Chairman of the club, and therefore he hoped he should not be considered tedious if he showed how fortunate the club was in having so good a president. That evening was the last occasion on which Mr. Wallis would have to preside over them that year. Another gentleman would fill the chair; and he earnestly hoped that, when Mr. Wallis's successor quitted office, the club would be as prosperous as it was then (Hear, hear). He had said, in effect, that they had the right man in the right place; and if any arguments were necessary to prove that, there could be no difficulty in bringing it forward. He conceived that, for the chairmanship of a farmers' club, it was necessary to have a practical farmer, or, if not a practical farmer, at least some one who had identified himself with the cultivation of the land, and took a deep interest in agriculture. Now in their present chairman they had a practical farmer (Hear, hear)—a farmer occupying a very large amount of land, and one whom his neighbours regarded as one of the best specimens of their class. "Depend upon it," one of those neighbours said to him that day—"depend upon it, whatever Mr. Wallis undertakes to do, he will do well" (Hear, hear). Not only had they the testimony of his neighbours in his favour, but his name was to be found among the list of the judges of the Royal Agricultural Society; and he really did not know a more honourable position than that. He felt that he had said quite enough in proposing the toast; and congratulating the members on the improved prospects of the club, he now left it in their hands.

After the toast had been drunk in the most cordial manner—

The CHAIRMAN said he could not adequately express his thanks for the very handsome manner in which the toast had been proposed and received. He felt that he was quite unworthy of what had been said with regard to him by Mr. Trethewy. He had, however, endeavoured to do his duty during the past year, and he felt greatly indebted to the members for the courtesy which he had met with on all occasions. He was confident that there were many gentlemen who would have filled his position with much more ability and with much greater advantage to the club than he had done (No, no). When, however, they did him the honour to nominate him, he felt bound to obey the call, and he should retire from the chair with the feeling that he could never forget the kindness which he had always experienced. He valued this club very highly indeed, on account of the many valuable friendships which he had formed in connection with it, and he should endeavour to support it as long as he lived. He would conclude by drinking to the good health of all present (cheers).

Mr. BULLOCK WEBSTER said he had been entrusted with a toast, which he felt great pleasure in proposing, namely, "The Royal Agricultural Society of England" (cheers). That society had now very great difficulties to encounter. Formerly it was very easy for the council to dispose of the routine sort of business, which constituted the bulk of their proceedings; but the case was very different in the present day. There were now no less than five or six different descriptions of the steam cultivator brought under their notice, upon the comparative merits of which they had to adjudicate. He might here observe that the gentleman who sat on his right (Mr. Halkett) had invented a new steam cultivator, which he was about to bring before the Agricultural Society, and which he was prepared to prove would perform the following operations at the following cost:—Ploughing, 1s. 7d. per acre; scarifying, 8d.; harrowing and rolling, 5d.; hoeing, 3d.; reaping, cutting, and delivering, 10d.; surface water, 1s. 2d.; carriage of manure and distributing, 1d. That was of course when the preparatory expenses in laying down the rails, &c., had been defrayed. It would require a good deal of the time and attention of the Council of the Royal Agricultural Society to investigate this matter, and he thought that was an additional reason why the society should be supported by farmers. Mr. Halkett prepared for the work of ploughing by placing rails on the surface of the land; and he must say that when so many thousands of pounds were spent in preparing to launch the "Leviathan," farmers should not grudge a guinea a-year to a society which undertook the task of ascertaining the merits of an invention, the object of which was to enable them to perform the operations of the farm in the shortest time and at the least expense (Hear, hear). He trusted that those farmers who had hitherto done nothing for the Royal Agricultural Society beyond drinking success to it would now be induced to come forward with their annual subscription (Hear, hear).

The toast having been duly honoured,

Mr. W. **Bennett** rose to respond. He said no one could feel more deeply indebted to the Royal Agricultural Society than he did. The society had been established about twenty years, and no one could be ignorant of the great benefit which had been conferred on the country by its proceedings. Agriculture had made such rapid progress during that period, that it might be said, as was remarked by Sir James Graham a short time ago, to have climbed almost every hill top, to have given fertility to barrenness, and changed the whole face of the country. (Hear, hear.) If a tract of land were now uncultivated, or not cultivated properly, it was quite an exception to the rule. In his native county, to which his attention was of course more particularly directed, he had lately taken a review of what had been done in the last forty years; and he had been exceedingly struck with the extraordinary progress which agriculture had made there. He had no doubt that for this improvement it was in a great degree indebted to the Royal Agricultural Society. It was the fashion to speak contemptuously of the practice of offering rewards to agricultural labourers for superior skill in ploughing; but, in his opinion, it was a great advantage to the community to encourage emulation among the labourers, in order that whatever they did might be done in the best possible manner. (Hear, hear.) It was a good maxim that "whatever was worth doing at all was worth doing well," and that maxim was as applicable to the daily operations of the farm as to any other branch of labour. (Hear, hear.) He had observed that if a labourer contracted a habit of doing things in a slovenly manner early in life, he hardly ever became a good labourer afterwards; and it was of great importance, therefore, that efforts should be made to excite a spirit of emulation among all who were employed on the farm. The Royal Agricultural Society had in that way been very useful to agriculture; and it was remarkable that in the counties where that society was best supported would almost invariably be found the best farming (Hear, hear). The society had been of great service in encouraging the best breeds of animals—those breeds which it would pay best to rear and to fatten. It had also done much to improve agricultural machinery. It was indeed astonishing what had been done in that department within the last fifteen or twenty years, and he fully expected that still greater results would follow if the society were supported in a proper manner. No man could predict what would yet be done by means of steam (Hear, hear); but he must say that he thought Mr. Webster was rather pulling the long bow when he spoke with such confidence of the ploughing of land at 1s. 7d. per acre (laughter). It reminded him of something that was said to him on an occasion when he was about to give evidence in reference to some agricultural topic. A noble lord who had been at the bar advised him beforehand to be careful not to put the matter too strongly, observing that when he was at the bar he never felt so sure of losing his cause as when his witnesses were ready to swear anything (laughter). He (Mr. Bennett) had always remembered that caution in similar cases. It was an important maxim that men never did themselves so much injury as when they put their case so strongly that no one believed it (laughter). He hoped he should not be misunderstood. He admitted that no one could fix a limit to the extent to which steam might be applied to the cultivation of the soil; but still he would recommend his friend, Mr. Webster, not to put the case of Mr. Halkett again quite so strongly as he had done (Hear, hear). Before sitting down he had to propose a toast, which he was sure would be well received by all present; it was "Success to the Smithfield Club." That society was the handmaid of the Royal Agricultural Society, and its operations had been exceedingly useful. They all knew that it had, like many other institutions, been a good deal abused. It had been said, for example, that the Smithfield Club encouraged the feeding of animals to such a pitch that no one could eat them. It might happen that a fashionable and delicate young lady would sometimes find on her plate a piece of beef that was too fat for her, and might turn up her nose at it; but it did not follow that good fat beef was not a good thing for the community at large. Moreover, it had to be borne in mind that the great object of the Smithfield Club was to determine the question what kinds of animals it would pay best to rear and fatten for the market. He believed that that club had within the last fifty years conferred immense benefit on this country. Why was it that England stood before all the rest of the world as regarded the quality of its animals? Why was it that, as regarded the growing and fattening of animals, no other country came near our own? It was because practical, business-like men had devoted their attention to the subject for a great number of years, and offered rewards for the best animals that were brought to London. Let the *Times* or any other great leviathan of the press say what it would on this subject, they must still strive to go ahead, they must still endeavour to improve the breed of stock, and he was confident that they would thus effectually promote both their own interest and that of the community at large. He would now propose "Success to the Smithfield Club!"

Mr. C. **Stokes** said, as an old member of the Smithfield Club, he felt great pleasure in rising to return thanks. Thirty years ago, he remembered when the Duke of Bedford withdrew his premium, this club was very near being broken up. Had it not been for a few spirited farmers at that time, it must certainly have become extinct; and he might leave it to any one who had that day visited the noble exhibition in Baker-street to say how great a loss that would have been. (Hear, hear.) No one could look at the Devons, the Herefords, and some of the Shorthorns; or examine the Long-woolled sheep, the Leicesters, and the Southdowns, without being gratified at the great improvement which had taken place within the last few years. It should be remembered that the Smithfield Club had been a pioneer to all the other societies having similar objects, and that but for it the various local associations would, probably, never have existed. (Hear, hear.) Its influence had been felt not only in this country, but even in France, where there had been periodical exhibitions of stock for the last five or six years. Moreover, the Smithfield Club might claim the honour of having produced the Royal Agricultural Society. Lord Spencer and the Duke of Richmond mentioned their intention of forming the Royal Agricultural Society to the members of the Smithfield Club, and Lord Spencer afterwards declared that it was the cheers with which the British farmers received the proposal, that encouraged them to proceed. No club in the kingdom, he believed, now rested on a surer foundation than the Smithfield Club. Their funds were in a most flourishing state. They had plenty of money to give away, and plenty of money to put by (cheers).

Mr. **Wilmot** said he had been called upon to propose the next toast, which was "The Committee of Management." He thought the best thing that he could do, in proposing that toast, was to refer to the report just issued, which showed an increasing number of subscribers, and an increase of the funds (cheers). If that state of things continued, the club must go on and prosper. He begged to couple with the toast the name of Mr. Wood, of Ockley.

Mr. **Wood**, in replying on behalf of the Committee congratulated the assembly on the fact stated in the report just issued—that 74 new members had been elected during the last year. It would be wrong to take credit on behalf of the Committee of the year for that increase; for the circulars which were sent round the country, with the able assistance of the Secretary, informing farmers generally that there was such an institution as a Central Farmers' Club, and setting forth its claims to the support of tenant-farmers—those circulars, he said, were issued by a previous committee. It had been already observed, that the subjects discussed had usually been very well introduced. He thought most persons would agree with him that the list of subjects for the past year had been more than ordinarily interesting; but, at the same time, he hoped the list for the ensuing year would be equally interesting and equally useful. There was one subject which to his mind appeared extremely interesting, and which he should be exceedingly glad to see brought forward. It had, indeed, already been introduced on one occasion; but it was done by a very incompetent individual—namely, himself (laughter). [Mr. Wood was understood to refer to the currency question; but he did not specify the topic to which he alluded.] On that subject he entertained very decided opinions; and he hoped it would be again introduced, by some gentleman who was competent to deal with it. It certainly could not be too well understood by the agricultural community.

Mr. BELL, responding to the appeal made to him by Mr. Baker, made an elaborate statement of his views on the currency laws, condemning the monopoly which, he contended, was practcally established, under the present system, in favour of capitalists as opposed to producers, whether agricultural or manufacturing, and referring to the suspension of the Bank Act of 1844 as a proof that the system required alteration. He concluded by proposing the health of the vice-chairman, Mr. Thomas, of Bletsoe, which was very cordially received.

Mr. THOMAS briefly returned thanks.

Mr. MECHI said he had been requested to propose "The Local Farmers' Clubs," in connection with the name of Mr. Pile, of Winchester. The remarks of the Chairman with regard to the Central Farmers' Club were applicable to farmers' clubs generally. If remaining always at home and never associating with farmers belonging to other parts of the country tended to perpetuate prejudice and obstruct improvement, still more must that be the case if farmers did not associate together in their several localities. One of the chief advantages of local clubs was that they enabled farmers to test the merits of their labourers in the field. He would not broach the delicate question of giving rewards for good conduct, because that was a question which was open to difference of opinion; but he must say that when a labourer who thought himself a capital ploughman found himself the worst ploughman among the competitors, that result was likely to take a little of the conceit out of him, and make him more humble and deferential in future. The same remark applied to farmers who competed for premiums for the best farms. Moreover, farmers' clubs tended to strengthen the social position of farmers in this country, and there could be no doubt that their association was in various ways a great mutual advantage. With regard to the prospects of agriculture, he agreed with preceding speakers that they had to look forward to important changes. Great improvements had doubtless been made in their own time, but it must prepare their minds for still greater ones. They had already got rid of the flail, which cost a shilling, and substituted for it a costly machine, because it did the work cheaper; and it remained to be seen whether or not that enormous power which clothed the world could not be substituted for the existing plough. Mr. Halkett, who had undertaken this task, was a man of great intelligence; and having gone the other day to see his machine at work, he must declare his satisfaction at what he witnessed. As regarded the expense, he did not think Mr. Bullock Webster was quite correct in stating the cost of ploughing at 1s. 7d. per acre, as that did not include the interest of money expended on the rail (Hear, hear). He supposed that was additional.

Mr. HALKETT: Yes.

Mr. MECHI continued: If the invention were adopted, the power of keeping "these horses" at work night and day would be an enormous advantage. He was happy to find that Mr. Halkett was going to explain his views on the following evening. The question at issue seemed to hinge on the practicability of using steam-power without encountering too much friction, and he hoped that question would now receive a satisfactory solution.

Mr. PILE, in replying, alluded to the efforts which were being made in his own neighbourhood to improve the condition of labourers. Besides the ordinary means, a society with which he was connected was endeavouring to promote that object by means of cottagers' shows. In order to make the labourers in the neighbourhood better gardeners they gave rewards for the best garden productions. They also bestowed premiums on the wives who were the best managers. The society had only been in existence two years, and there was already visible and material improvement.

The Rev. Mr. JAMES, on rising to propose the next toast, said, having had a glimpse of the list of toasts, he regretted to find that the honest and hard-working agricultural labourers were not included. He had no doubt that that omission was an inadvertent one, and would be supplied. (Hear, hear.) The toast which he had himself to propose was, "The Agricultural Press," coupled with the name of a man, whom to know was to esteem—he meant Mr. Tuxford. (Cheers.) He would say of that gentleman that his principles of action always appeared to be the same.

Mr. TUXFORD felt very much indebted to all present for the kind manner in which they had been pleased to receive his name in connection with the agricultural press of this country. He did not know that any man could fill a prouder position than the one in which he was required faithfully, conscientiously, and independently to discharge such functions as had fallen to his own lot (hear, hear). Still perhaps there was no office with duties of a more onerous character attached to it. (Hear, hear). You had to speak independently of all men, regardless of any crochets or any peculiar views which they might entertain, and even at the risk of giving them offence. You had to speak the truth on all topics without considering the consequences which might befal you in the discharge of your duty. Now, when such was the case, the recollection of the kindness evinced towards himself that night would be a source of satisfaction to him through life (hear, hear). But if ever the press of this country should be actuated by sinister motives, or led by anything else than a sense of rectitude, it would forget the nature of its office, and descend from the high position it had now attained (hear, hear). He would now supply the omission mentioned by Mr. James—and in doing so be thoroughy agreed with him could only have been an oversight—by proposing "The Agricultural Labourers," and he was quite sure there was not a person present by whom that toast would not be received with as much enthusiasm as any preceding one (cheers). He was glad that so much attention was now being devoted to the education of agricultural labourers. There was a period when the plough constituted almost the only implement on the farm. That time had now happily passed away—a very different state of things existed—and if they wished to cultivate their farms on the best principles, they should take care to educate the labourers, so as to prepare them to properly fulfil their duties, instead of injuring, from their want of knowledge, the new machinery which was now being brought to bear on agriculture (hear, hear).

The toast was drunk with enthusiasm.

Mr. W. SHAW proposed "The Secretary," observing that it was the united testimony of all who had had the means of forming an opinion, that no man could possibly discharge the duties of the office better than they were discharged by Mr. Corbet (cheers).

The toast was very warmly received; but Mr. Corbet having retired shortly before, was of course unable to reply.

The concluding toast was "The Visitors," coupled with the name of Mr. Halkett, and to which that gentleman replied at some length on the subject of steam power, and his own invention.

The company then separated.

EXTRAORDINARY AGRICULTURAL CASE.—At the Aylesbury County Court, on Friday, Nov. 20th, an important case was heard, and the facts involved the point whether the owners of bulls are permitted to turn them out without taking proper care that they could not break through the fences and herd with other grasiers' stock. The plaintiff was Mr. Senior, of Broughton-hall, near Aylesbury, a magistrate for the county, and a well-known grasier; the defendant being Mr. Self, the manager of the London and County Bank at Aylesbury. The action was brought to recover the sum of £19 19s., for damages from the negligence of the defendant. It was alleged that the plaintiff had, at great trouble, secured a pure breed of Devons, which were depasturing in a field adjoining Mr. Self's grounds, in which was a bull, which trespassed on the plaintiff's grounds, and associated with his stock; in consequence of which the plaintiff said a most valuable heifer, the produce of the bull which had won the prise at Norwich, and had never been beaten, and a cow which he had bought of Lord Macclesfield, was in calf. He (plaintiff) said it was important that his stock should remain pure. He said he was offered 30 guineas for the produce of the heifer which was the cause of the action; but owing to Mr. Self's bull having comt mitted the trespass, he sold the heifer and calf (which oughto have been worth £40) for £17 10s. The witnesses stated that Mr. Self's fences were very bad. Mr. G. L. Brown, barrister, for the defence, contended that the case had nothing to do with the breeding of cattle, but was merely a little bit of private quarrelling. It was said that there was an assumed likeness between the calf and his suspected sire; but there was no daguerreotype, and of course no likeness could be proved. He contended, therefore, that there was no proof that the plaintiff had sustained damage at the defendant's hands. He called upon the jury to give the plaintiff the smallest conceivable coin in full satisfaction for any conceivable injury he had sustained. Various witnesses, including Mr. Gadsden, the extensive auctioneer and valuer, and Mr. H. Phillips, the well-known dealer of Thame, were called on the part of the defendant; and they swore that there was nothing extraordinary in the breed of the plaintiff's stock, and that the heifer and calf were not worth more than £17 or £18. Other witnesses swore (in opposition to what had been urged on the part of the plaintiff) that the defendant's fences were in good condition. His Honour, Mr. C. Temple, summed up at great length. The jury retired, and, after being absent about half-an-hour, found a verdict for the plaintiff—damages 1s. Immediately the verdict was announced, the court, which was densely crowded throughout the whole five hours the case lasted, rang with a shout the like of which has never, perhaps, been uttered there on any such occasion. It was, however, of course, suppressed by the officers and the judge.

ROMAINE'S CANADIAN STEAM CULTIVATOR.

TO THE EDITOR OF THE ENGINEER.

Sir,—Certain errors having been, inadvertently or otherwise, promulgated respecting the above invention, calculated to depreciate the efficiency of the "Cultivator," and to detract the honour of the invention from the rightful and sole inventor, we shall feel obliged if you will give prominency in your journal to the following remarks in order that the public may be rightly informed on the subject.

A writer in the *Illustrated London News* of Oct. 3rd, 1857, whilst strongly commending the invention, makes the following delusive remark:

"Crosskill's Romaine Cultivator.—We give an illustration of the new steam-cultivator, invented by Mr. Robert Romaine, a Canadian; improved and manufactured by Messrs. Crosskill, the eminent agricultural implement makers, of Beverley, Yorkshire, whose name is so well known in connection with the clod-crusher. .... Crosskill's Romaine steam cultivator differs from all others hitherto brought before the public, in entirely dispensing with ropes, &c."

In reference to the above paragraph, we deem it necessary to state that Mr. Robert Romaine, of Peterborough, Canada, but now residing at Beverley, in Yorkshire, is the sole and entire inventor, and that the whole of the improvements that have been made in it have been effected by himself, and not by another party, as therein implied; and further, that the machines are manufactured by the trustees of the Beverley Iron Works, from Mr. Romaine's own suggestions and improvements.

In the same paper of the same date it is subsequently affirmed that Mr. Romaine sent one of his machines (the second that was built) to the "Great Exhibition of Paris in 1855, where the inventor, Mr. Romaine, was one of the Canadian commissioners. This machine, like Mr. Mechi's, was to be drawn by a pair of horses, the steam power being employed in turning the cultivator. In Paris Mr. W. Crosskill saw it, and thought so well of it that he took it up, and the firm have spent two years and some thousand pounds in bringing it to its present state of efficiency. The third machine would not steer or travel, until the wheel arrangements had been changed to the present form and proportions."

With regard to the above statement, which is decidedly and injuriously incorrect, it is necessary to state that the second machine, which was intended for the Exhibition at Paris in 1855, worked on the plains of St. Denis during the summer, and tilled the land. As well as the present one it was not drawn by horses, but propelled itself over the land by steam-power, being only deficient in its boiler and steering apparatus. The third machine, being the first built by the trustees of the Beverley Iron Works, was perfect in its steering apparatus, and travelled equally as well as the present one. The statement that the firm have spent some thousand pounds in bringing it to its perfection requires no answer, as the trustees of the iron works are alone the responsible manufacturers.

The same errors have been fallen into or communicated to a writer in *Bell's Messenger*, of September 21st, 1857, in which paper it is stated: "Romaine and Crosskill's steam cultivator.—On Friday, the 11th instant, Messrs. Crosskill broke the silence they have so long maintained as to the steam cultivator, which they entered but did not produce at Chelmsford and at Salisbury."

The claim Mr. Romaine enforces as the sole inventor and improver of the machine, as stated before, is a satisfactory reply to the mistakes disseminated by such an incorrect version of the invention. In the same article it is afterwards stated: "The patentees estimate that it (the machine) can do nearly an acre an hour, and work at night as well as day."

In reference to this quotation, we beg to say that Mr. Romaine has the sole credit of the patent, and with him alone is vested the power of granting licenses for its manufacture. The writer in the same paper afterwards adds—"At that time (that is during the Paris Exhibition) it could not steer, and could not work without breaking down."

It will be observed that the writers in the *London News* as well as in *Bell's Messenger*—probably one and the same party—have fallen into the same error, and made the same misstatement. As the repetition of these mistakes and erroneous representations in other papers might prove both prejudicial to the inventor and the invention, we trust you will do justice to both, as well as to the manufacturers and the public, by giving insertion in your journal to these very necessary corrections.

R. Romaine, and T. E. Turner,
(for the Trustees of the Beverley Iron Works).

Beverley, Nov. 13th, 1857.

ALUM IN BREAD.

Sir,—More alarm may perhaps have been excited upon this subject than it requires; for when used with sound flour, merely to whiten the bread, and in quantity not exceeding 1 oz. to the bushel of flour, it would not be likely much to affect a healthy stomach. But even then it is an illegal and dishonest practice, and might hurt weak digestions; and when used in arger quantity, with unsound flour to give it the appearance of sound, the unsoundness of the flour and the increased quantity of alum are likely to be very injurious in daily use, particularly to the aged and infirm poor who have little or no other strengthening diet. And this is probably the way in which most of it is used.

The precise detection of the alum is a nice point.

But there has just been suggested a simple method of discovering it, not only easy but rather amusing. Many housekeepers are aware that logwood strikes a purple dye with alum, but not so evidently without; so, if we put a slice of bread into a solution of logwood, and let it soak three or four hours, and then take it out, if it contains alum it will have taken the purple dye, but not otherwise. Making therefore a logwood solution, by boiling a few chips of logwood in a good pint of soft water in a pipkin or skillet (not iron), till the liquid becomes a deep orange colour that one can just see through, straining it off, letting it cool in a basin, then putting in a slice of bread without crust, between a quarter and half an inch thick, letting it digest two or three hours, and then taking out the bread and breaking it; if it contains alum it will be dyed purple, more or less through (not merely on the surface), except the bread is very sour, which will prevent the dye from changing colour: or, on the other hand, when the baker or miller has put in *too much soda* to correct the sourness, in which case it will turn purple (liquor and all) without alum, so that it is not quite certain; though if bread which is *not sour* takes no purple dye, it may generally be regarded as free from alum, and when it does take the purple it is likely to be alumy or otherwise unsound, and if needful should be submitted to chemical examination.

J. Prideaux.

P.S. I am obliged to your correspondent for the complete information respecting "till-seed." It is odd enough that the English translator should have gone to India for a name so well-known as Sesamum or Sesame, at least from the first translation of the "Arabian Nights' Entertainments."

ROYAL DUBLIN SOCIETY WINTER EXHIBITION OF FARM PRODUCE.

Those who have had an opportunity of visiting the Christmas shows of the Smithfield (London) Farmers' Club, for the last few years, have been delighted and instructed with the extraordinary specimens of mangel-wurzel and other crops from Ireland. Without drawing any invidious distinction between English and Irish farming, it must be confessed that so far the Emerald Isle has yielded larger roots than has been produced on British soil. Whence arises this superiority? There is much in the climate of Ireland; but we believe that the chief cause lies in the stimulus given to Irish agriculturists by intercourse with those English and Scotch farmers who have made Ireland the land of their choice. If this supposition be correct,—and it is the opinion of many Englishmen of our acquaintance,—what an apt illustration the circumstance affords of the importance of having our own experience whetted occasionally by intercourse with others—by an occasional run by "rail and road," to see a cattle show, or the farm of some eminent agriculturist.

With these introductory observations, we proceed to give a brief notice of the exhibition of farm produce opened on Limton Lawn last Thursday, under the auspices of the Royal Dublin Society. The show is decidedly the most successful which we have seen, either in Dublin or anywhere else, both as to the number of entries and the excellence of the specimens. Passing by the cereals and liguminous crops, which were very creditable, but which present few features worthy of notice, we come to the plants cultivated for their roots and tubers. Judge Radcliffe (per his steward, Mr. Lincham), and Mr. Vernon, of Clontarff Castle (steward, Mr. Bowers), are at once the most extensive and successful exhibiters in this department. The forms had 109 entries, all admirable specimens. Some of the mangels are on average half a stone heavier than any yet produced. In the long red, red globe, and yellow globe varieties, Mr. Vernon got first prize. We apprehend Mr. Lencham's were weightier specimens, but Mr. Bower's were cleaner and better grown. These gentlemen exhibited sugar beet nearly as large as the largest of the mangels; and if the specimens of Robert Rabi can at all be considered a fair exponent of what that root is capable of producing, the farmer may safely calculate on having another valuable crop for feeding cattle. We have experimented largely on this root, and our opinion of it is certainly very favourable. It is a hardy and nutritious crop. At first the yield was so inferior that many abandoned it immediately; but they seem to overlook that on its first introduction the yield of the turnip was equally small.

We may be excused for undertaking to correct an opinion which, from judging by the monster root at this show, many persons, especially landlords, form as to the capabilities of the soil. One often hears the question, "Why can't my stewards and my tenants grow as large roots as these? My steward raises only 25 or 30 tons an acre, and here I find as much as 60 or 80 tons. Had my land been skilfully farmed, my rental would be double what it is!" These are questions of vital interest to the agricultural community. And with all deference to the exhibiters we have named, we must express the opinion that the specimens exhibited on this occasion have not been produced by legitimate means. We don't mean to detract from the merit of these exhibiters; they have all the same means of *forcing*, and the same command of manure and labour; but the weak point in the whole system is, that only a few roots are taken as the standard of superior skill and well-directed industry. Mr. Lencham is, beyond all doubt, a most successful farmer, and so is Mr. Bowers; but give either of them an ordinary farm, and no extraordinary means, and will he produce mangel weighing 2½ stones?

We would next draw attention to the potatoes. As usual, Dr. Taylor is an extensive and successful exhibiter of this tuber. "Taylor's seedlings" were justly awarded a first time. Several excellent varieties were contributed. We find that great confusion has arisen respecting the White-rocks and Downs, which are generally regarded as the same potato; they were so regarded on this occasion. They possess distinct properties. The White-rock has a pink blossom, with a slight pinkish tint in the eye; high in the shoulder, and hence the term "rocky." The Down has a white blossom, a soft and *downy* eye, not so coarse a potato as the Rock, and occasional specks are seen under the cuticle.

We were glad to see that the agriculturists in connexion with the National Board of Education have cheerfully come forward for the first time as exhibiters of farm produce. This is a step in the right direction. Much has been said against the Board school farms of late; and the most judicious course which the agriculturists could pursue, is to come fairly before the agricultural public, who are competent to judge for themselves, and who can see if the managers of these institutions are up and stirring. As we cannot here enter into their merits, we will only observe that the collections contributed,—but not for competition, a wise idea, as public bodies and private individuals should not compete,—are exceedingly creditable in quantity and quality.

A VISIT TO THE SMITHFIELD CLUB FAT CATTLE SHOW.

SIR,—The season has again come round at which the agricultural gatherings are directed to the Smithfield Club Cattle Show in Baker-street; and a cab being scarce, and an omnibus generally *non est inventus* yesterday, on account of the dense fog, I groped my way thither by the "marrowbone stage," as they say—the only resource left to me; a dangerous alternative for old bones like mine to be reduced to. I arrived, however, safe and sound, and was pleased to find that the discomforts of the weather had not prevented the public from turning out on the occasion, but that the attendance was as numerous as ever; a plain proof that, unlike our neighbours the Parisians, the Londoners take a deep interest in these exhibitions.

Any Englishman, indeed, who has the real welfare of his country at heart, and is more fond of the *solid* in national glory than of the *superficial*, may well feel proud of the magnificent display of animals exhibited this year. I saw also many foreign gentlemen there, but did not recognize so many as I could have wished. The subject of agriculture is viewed in a different light on the continent from what it is with us. Even in France, where powerful efforts have been made by the government to drill the higher class of the landed interest into a liking to it, the success hitherto has been very partial and weak. Nor will it be possible to effect any great and important change in this respect whilst the subdivision of the land into minute portions continues. This is the great bane of agriculture, not only because small occupiers, such as the overwhelming majority of French farmers consists of, have neither the skill, the disposition, nor the capital to carry out improvements, but because the very circumstance of the land being in the hands of such a class of cultivators excites disgust of rural affairs amongst those classes which in England are the chief supporters of agricultural institutions. This, however' is a digression for which I must apologize.

I have termed the display of animals a magnificent one, and such it certainly is. I think the show of cattle far superior to that of last year, and I'll tell you why; simply because the graziers have taken the hints that have been given them from time to time, and have attended more to symmetry and compactness of form in the selection of their cattle, than to that excessive obesity which has characterized the former exhibition, and which led a tallow-chandler to remark, in an excusable pun, "It was much more advantageous to the *lights* than to the *liver*."

The show of Devons is an admirable one: they are perhaps *smaller* this year, generally speaking, than last; but in this respect the standing toast of the late Earl of Leicester, "*small in size but great in value*;" has been adopted by the graziers. Some of this breed show a perfection of symmetry never exceeded. Amongst these I noticed No. 6, which received the first prize in class 1, and No. 11 in class 2, which I think was more entitled to the first prize of £25 than that of £10, which it received. Mr. Heath has certainly been very successful this year, and has contributed some excellent types of other breeds as well as of the Devons.

The heifers and cows of this latter breed were admirable. Nos. 23 and 24 were everything that can be desired in point of symmetry and compactness. The latter number, which took the first prize, is certainly the most finished, but I question whether No. 23 would not equal, if not excel it at the same age. No. 30 also is a complete animal, and does equal credit to the breeder and the grazier.

Amongst the Herefords and Shorthorns I noticed some first-rate animals, but cannot stop to particularize all of them. I found I had put a mark to several which had not received the special approbation of the Judges, amongst which were No. 72, remarkable for the degree of *finish* it has attained at the "tender age" of two years and eleven months; No. 80, which does not appear to have even been "commended"; and No. 173, an extra shorthorn heifer, which I think is as compact an animal as any in the show, although not specially noticed. The other breeds possess less interest with me, but there are some very fine cattle amongst them, particularly the "Sussex breed." Are these a distinctive race of cattle, or a mixed breed adopted by the Sussex farmers at some by-gone period? Their history is worth inquiring into, and if any of your Sussex correspondents can throw light upon it, their doing so will confer a favour on the public generally, everything connected with such a subject being interesting and important to the agriculturist.

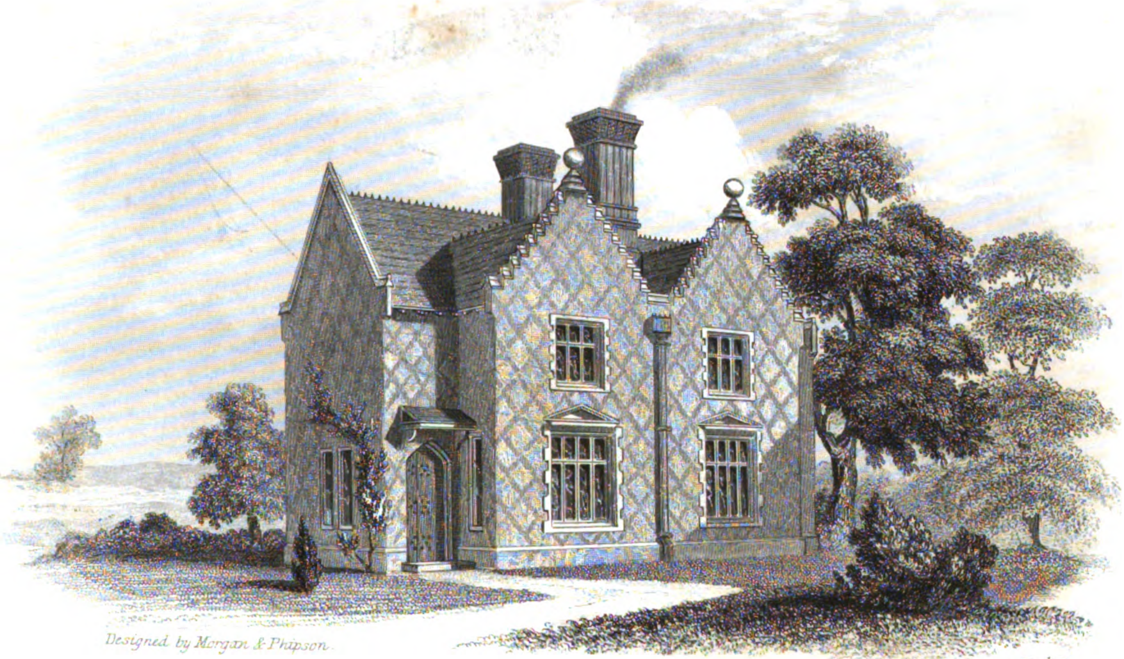
I was surprised to see so few Galloway or Aberdeen Scots, and should regret to find that that breed is less in favour than formerly. They have stood the test of time in my native county, and have always proved the most profitable of any cattle for either winter or summer grazing; whilst no beef is superior to theirs on the table. With the Irish breed we can very well dispense; their long horns and pugnacious tempers rendering them dangerous to other cattle, either in the pasture-field or the yard. The Highland Scots are equally objectionable on the same account, and never ought to be put with other cattle. Small as they are, they will drive a shorthorn of giant size, compared with themselves, out of any yard.

Upon passing cursorily through the sheep-pens the first time, it struck me that that department was less satisfactory than it was last year. A second and closer inspection convinced me that this is the case *only* with the Southdowns, which certainly are neither so numerous nor so generally meritorious as they were last year. Two or three of the breeders, however, of that race have maintained their standing; and amongst them are Mr. Rigden and Lord Walsingham. I do not think the Judges have done the latter noble breeder justice in awarding him only the second prize for No. 267 (Class 37), for I certainly consider them a superior pen of sheep to No. 269, which obtained it; and I know that this opinion was shared by others. The Duke of Richmond has some excellent pens of Southdowns, and carried off a full complement of the honours of the Show.

Some of the Hampshire and West Country Downs are remarkably handsome sheep. Amongst these I particularly noticed 274, 279, and 280, as possessing extraordinary merits, although neither of them obtained a prize, and only one of them (280) was even commended.

Of the long-woolled breeds there are some excellent specimens. No. 181 is what the French would call "magnifique," and well deserved the distinction of the first prize and silver medal. Lord Berners' *pure* Leicester (No. 191) very properly won a "golden opinion" in addition to the £20 prize. Mr. Overman's half-bred Down and Leicesters were an excellent type of that breed. I regretted not seeing the name of his relative, Mr. Henry Overman, of Weasenham, amongst the exhibitors this year.

My remarks on the "swinish multitude" must be brief. In one word, they come fully up to the mark of



Designed by Morgan & Phipson.

J. H[illegible]

Two Labourers' Cottages

On the Estate of Sir George N. Broke Bart. C.B. at Broke Hall near Ipswich Suffolk.

London Published by Rogerson & Tuxford, 246 Strand 18[illegible].

last year, and I must again express my astonishment at the enormous weight most of the pigs have attained in an incredibly short period. One pen of these animals, only five months and a few days old, were estimated by two butchers to weigh 12 *stone long weight*, each. This is making good use of their time with a vengeance. The pigs-royal were not so successful as last year, but I can assure the royal breeder and feeder that this was from no fault in the stock, which is as lovely as ever; and we are sure his royal highness will feel more pleasure in witnessing the perfect impartiality of the Judges than he would have done in receiving the first prizes.

I noticed one *improvement*, which appeared to me somewhat too refined. Several of the pens were furnished with *pillows* for the pigs to lay their snouts on when they were sleeping. What would the Highland chief of the last century (mentioned by Walter Scott), who kicked a snow-ball from under his son's head, calling him "an effeminate young rascal, not to be able to sleep without a pillow"—what, I repeat, would the old chieftain say to pigs being furnished with such luxuries?

I must reserve my observations on the machinery, &c.

Yours, &c.,

AN OLD NORFOLK FARMER.

London, Dec. 9.

PLATE II.

TWO LABOURERS' COTTAGES,

ON THE ESTATE OF SIR GEORGE N. BROKE, BART., C.B., AT BROKE HALL, NEAR IPSWICH, SUFFOLK.

Upon the present Baronet succeeding to the picturesque property of the Broke family, running for some distance along the south side of the Orwell, one of the prettiest rivers in England, he determined to effect considerable improvements in the dwellings of the farm servants and other peasantry on his estate. In furtherance of this object, he has erected, on various parts, model cottages, according to the accompanying view and plan.

These are constructed of red brick, relieved with black, worked in different patterns. The roofs are of high pitch, and covered with plain tiles, the best and most durable covering that has yet been discovered, effectually excluding from the upper rooms heat in the summer and cold in the winter.

The cottages have an abundant supply of water from a well sunk at the back of each pair, in addition to as much soft water as can be caught from the roofs. They are also thoroughly well drained.

The two front rooms on the ground-floor are of wood; the others have pavements and bricks laid on a good thick bed of concrete. None of the wood work is painted, but merely slightly stained and varnished, by which process the grain of the real wood is preserved, and the material itself sufficiently protected.

The height of the lower rooms is eight feet three inches, and the chambers (of which there are three to each cottage) six feet nine inches to the springing of the roof, and ten feet nine inches to the collar, to which they are ceiled. Every bedroom has a fireplace and stove.

Each cottage is provided with a good-sized baking oven, copper, sink, and well fitted up pantry, besides the requisite outbuildings for wood, coals, and other conveniences.

The glazing of the windows is done with quarry lead lights, in iron frames and casements.

The cost of each pair of cottages has averaged about £300, and the occupiers seem greatly to appreciate the boon that has been thus conferred on them.

A good-sized piece of garden ground has been allotted to each, fenced off with low wood fencing.

The cottages have been erected from the designs of Messrs. Morgan and Phipson, architects.

CALENDAR OF AGRICULTURE.

This month is often very stormy, especially in northern latitudes, where snows and frosts prevail. In hard weather, carting will form the chief attention of the farmer—stones to drains and roads, fuel to the dwelling-houses of the farm, and of dung from the cattle-yards to the fields, where it will be wanted for the fallow crops. Lay the heap in a lane, or in a convenient place in the field; make it oblong square in shape, sloping at the ends to allow the loaded carts to pass upon and over it; spread each load evenly over the heap of six feet in height, dress it neatly, and lay earth on the edges. The heap should have a dry lair and level.

The ploughing of lands for Lent crops will be forwarded in fresh weather, and very advantageously during this month, as a time is given before sowing for effecting a pulverization, and it does not, by a lengthened exposure of the land, reduce it into a hard and battened condition. The ploughing of leys for grain crops, and of stubbles for fallows, must be vigorously pushed in this month.

In fresh weather, continue the cutting of copses and underwood, the cutting and splashing of hedges, the scouring of ditches and road sides, and clear water-courses; cut drains to half the depth to be finished in summer. Float water-meadows, and lay dry occasionally. Sow winter and spring wheats on lands cleaned of turnips, and on fallows left in autumn.

Collect and prepare artificial manures of every kind, and keep them under a dry, open shed.

The live stock on the farm of all kinds will require the most constant and unremitting attention of the farmer, if he would rear the animals to profit, and derive advantage from his labours, never forgetting the great effects of minute care in increasing the produce of a farm. Supply the cattle in the yards and horses with fresh straw daily, and give turnips or other roots early in the morning, that the animals may eat during daylight, and be seen when choked or swollen. Turnips are better fresh drawn from the field daily as wanted; but the danger of heavy snows covering the roots from use, renders necessary a heap at the homestead, containing a few weeks' supply. The yards must be littered with straw frequently—thinly and evenly.

The milch cows will now begin to drop calves; feed with succulent food, with steamed roots and chaff. Suckle both veal calves and for weaning; disregard the old maxim that animals must be starved in order to be reared at little cost; when milk is exposed, the most valuable parts—the gaseous fluids—go off by evaporation; hence the superiority of suckling over hand-feeding. When dairy produce is wanting, use a part of the cows for that purpose, and the other for rearing calves; allow ample food in every case. Have the calf pens divided into single apartments, about four feet by eight feet, opening into the cow-shed from the end or from behind, if the width of the shed admit.

The sheep flocks must have fresh turnips daily from the field, rooted, but not topped in the separate fields where the animals are lodged in different flocks, as ewes, store flocks, and fattening flocks, as arranged after autumn. The lambs of the last year and the feeding flocks may be confined on the growing turnips, or be fed on a ley or stubble field. A two-horse cart load will be sufficient for forty fattening sheep, and to keep one hundred in store condition.

Feed farm-horses with cut chaffs of clover and straw, oats and beans, and give a warm meal of steamed potatoes in the twilight, after the day's work is over.

The piggery must not be neglected; feed largely and litter amply. Rear the store pigs with roots; as potatoes and beet, raw; the fattening hogs with steamed roots, chopped and mixed with meals, served regularly thrice a day. No stock repays attention better than pigs.

Last in common estimation, but not least in general use, comes the poultry yard. Feed with light grains and steamed potatoes, mashed and mixed with meals, in a shed under cover, and have the lodging-house comfortably fitted up, and heated, if possible. Separate apartments for each kind of animals must be provided.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR DECEMBER.

Notwithstanding that only moderate supplies of home-grown wheat have been on sale in the whole of our leading markets, and that the imports from abroad have not been to say extensive, the wheat trade has continued in a most inactive state, and prices have given way to some extent. In many quarters it has become a question for serious consideration whether we have yet reached the lowest point; but we are not prepared to agree with some parties that ruin is staring the agricultural body in the face, because the causes which have led to the rapid decline in the value of produce are exceptional, and may eventually be removed. In the first place we must bear in mind that we have been passing through a commercial crisis of a most severe character; in the next, that the consumption of the better kinds of food has, as a consequence, fallen off; in the next, that the value of money has ruled unusually high; and, lastly, that the French Government have allowed the export of native produce free of duty. Without assuming that we shall have any great increase in the use of bread during the next two or three months, we may safely state that the worst of the commercial panic has passed away, and that, as stocks of manufactured goods are now becoming small in nearly all the markets of the world, we shall shortly have a return of that prosperity which, up to a certain point, was taken as a true index of our commercial greatness. Money, too, is now becoming more abundant, and discount accommodation can be obtained on much lower terms. There are indications of a steady upward movement in the value of wheat; but then we may have to contend with large importations of flour from France, and, if the supplies fall into comparatively weak hands, continued sales may be effected to the prejudice of the value of home-manufactured qualities. The prospect of large arrivals of this article alone keeps the wheat trade in a state of depression, because we see no reason whatever to assume that we shall receive other than limited quantities from the United States during the whole of the winter, and because future supplies of foreign wheat—especially from the North of Europe, owing to the closing of the navigation—will be on a very limited scale during that period. Again, owing to an unusually large number of forced sales, the stocks of foreign wheat in the United Kingdom are now reduced to a narrow compass; but, against this deficiency we must place an unusually large crop of English, the bulk of which is still in the hands of the growers, and the imposition of a duty of 20s. for every twenty-two gallons of spirit imported into France. This duty will of necessity check the demand for barley in this country for distilling purposes, and throw the greater portion of the foreign supply into the hands of the third-class millers, who are now competing with the first-class on severe terms. But even these adverse influences may be counteracted by the partial failure of the potato crop, which for some time past has been partly made good by extensive arrivals from France and other parts of the Continent. Supplies from those quarters, however, cannot be continued at their present rate, or about 1,500 tons weekly, and we may eventually be thrown more upon our own resources than appears to be generally imagined. For the reasons here alluded to, we see no reason to apprehend a further rapid decline in the value of wheat or other articles.

For the time of year, the weather has been remarkably fine and open, and the wheats have. consequently, stood in need of frost to check premature exuberance. They are certainly looking well; but, unquestionably, they are more forward than is desirable. Out-door operations generally are in a satisfactory state in all parts of the country.

We regret to find that the potato pits exhibit unmistakable signs of extensive disease. The quantity of potatoes lost this year by rot is immense; hence, good and fine samples are now commanding in the metropolitan markets from 100s. to 140s. per ton, and these high quotations have produced an enormous importation of potatoes from the continent. The arrival during the month has exceeded 5 000 tons, chiefly of a third-rate quality, though free from disease, and which have sold at from 55s. to 65s. per ton. There is still a large supply in France and Belgium, but it is a debatable ground whether future imports will keep up to their present amount.

Prices of both wheat and flour rule very low in France, notwithstanding that flour has been shipped to some extent; and they continue to exhibit a fair margin of profit on exports to this country. In nearly all the other markets of the world, the result of abundant supplies of produce, the quotations are comparatively easy.

The various cattle markets have been well supplied with beasts in first-rate condition for Christmas consumption. The trade, considering the extent of the supplies, has been tolerably healthy, and prices have ruled moderately high. Other kinds of stock, except pigs, have sold at very full quotations. As regards the rather low value of pigs, we may observe that their supplies have wonderfully increased in this country in the course of the year, and that, consequently, the demand for them has been more readily met.

The wool trade has continued in a state of great depression. Prices of all kinds of wool have fallen to a serious extent, arising from the commercial panic, and up to the present time there are no buyers unless at further depressed currencies. The American dealers have returned to this country nearly 9,000 bales, originally shipped, but which are now being forced for sale here.

For hops there has been only a moderate demand. The supply in the hands of the growers and factors continues large, and prices have consequently ruled very easy. About 900 bales have come in from Hamburg; but, owing to the high duty, they have not entered into competition with native-grown qualities.

In Ireland and Scotland the transactions in wheat and other kinds of grain have been on a very moderate scale, and prices have had a drooping tendency. The shipments to England have been on a very moderate scale.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that the total *number* of beasts exhibited in the Great Metropolitan Market for Christmas consumption has fallen short of the corresponding month in 1856, the supply, taken as a whole, has seldom or never been equalled in weight, quality, or symmetry. Taking advantage of past experience, the breeders and graziers have persevered until they have succeeded in effecting an important and most gratifying change in the symmetry of the various breeds; consequently, they have at length blended fat and lean together, and altogether repudiated the production of monstrosities, which, in a general way, leave very little profit either to sellers or buyers. Such a system as the present, if persevered in, must work immense advantages to all parties, and better regulate the judgment of those connected with the production of fat stock. All who visited the Show-yard in Baker-street, and who paid a visit to the "great" market, will perfectly understand the object of these remarks; they will understand that *fat alone* is not a feature which will ever render meat more valuable in the eyes of the consumer, or adequately repay either the breeder or the butcher. A point, then, of no ordinary importance has been gained, and which may eventually be a source of considerable profit to the producers.

When we consider the great *weight* of meat brought forward, and the drawback to the demand inseparable from a great convulsion in mercantile affairs, the trade may be called healthy. The beasts have sold at what may be termed fair, but not extravagantly high rates, and a much larger number of them have changed hands at market rates than we were prepared for. Sheep have likewise met a good trade at improved quotations. The Norfolk season for beasts has now commenced, and that from Lincolnshire is just closing. The forthcoming supplies from the eastern districts are expected to come up to their usual average.

The following are the total supplies of stock exhibited in the Metropolitan market:—

Beasts	19,830	head.
Cows	375	„
Sheep	69,132	„
Calves	1,209	„
Pigs	1,915	„

COMPARISON OF SUPPLIES.

Dec.	Beasts.	Cows.	Sheep.	Calves.	Pigs.
1856....	23,995	475	73,200	1,526	2,380
1855....	22,412	590	94,030	1,376	3,184
1854....	20,298	120	88,880	1,573	2,746
1853....	23,314	484	88,480	1,143	2,403

Beef has sold at from 3s. to 5s.; mutton, 3s. 2d. to 5s. 6d.; veal, 3s. 10d. to 5s. 6d.; and pork, 3s. 6d. to 5s. 4d. per 8 lbs., to sink the offal.

COMPARISON OF PRICES.

	Dec., 1856.					Dec., 1855.					Dec., 1854.				
	s.	d.		s.	d.	s.	d.		s.	d.	s.	d.		s.	d.
Beef, from	3	10	to	5	0..	3	4	to	5	4..	3	4	to	5	4
Mutton ..	4	0	—	5	6..	3	4	—	5	0..	3	6	—	5	4
Veal	3	8	—	5	6..	3	10	—	6	0..	4	0	—	5	8
Pork	3	8	—	5	4..	3	6	—	5	0..	3	2	—	4	8

Very limited supplies of foreign stock have arrived in the port of London, the total import being as follows:—

Beasts	931	head.
Sheep	5,188	„
Calves	489	„
Total	6,608	head.

In the corresponding month last year, we received 11,079; in 1855, 19,515; in 1854, 18,349; in 1853, 21,918; and in 1852, 11,870 head. It will, therefore, be seen that our importations from the continent are still falling off, and that consumption is almost wholly met by home produce.

The month's supplies from Lincolnshire, Leicestershire, and Northamptonshire have amounted to 10,100 shorthorns; from Norfolk, 2,200 Scots and shorthorns; from other parts of England, 4,500 of various breeds; from Scotland, 1,150 Scots; and from Ireland, 636 oxen.

Very large supplies of meat have been disposed of in Newgate and Leadenhall. Beef has sold at from 3s. to 4s. 8d., mutton 3s. 2d. to 4s. 8d., veal 3s. 8d. to 5s., and pork 3s. 6d. to 5s. 4d. per 8lbs. by the carcase.

Throughout the continent, fat stock continues very high in price—too high, indeed, to allow of profitable shipments to this country.

There has been only a moderate business doing in cakes and linseed, and prices have had a drooping tendency, although the imports have been on a very moderate scale.

SOUTH LINCOLNSHIRE.

In the midst of the serious depression under which agriculture is now labouring, it is very encouraging to witness such a beautiful season as this we are now so pleasantly passing through. We find ourselves engaged in such unusual farm-operations as to lead us to think that the winter has actually passed away, and the interesting routine of spring-culture in reality set in. We find in all directions the fallowing and clearing of land general; the cultivator, harrow, and roller everywhere at work, and the twitch-fires as numerous and bright as at Midsummer. This early preparation of the land for the spring-crops augurs well. Potatoes, should the season be favourable, may be planted just when the planter pleases; and the grain-crops have not been forgotten; many lands have been under preparation for them. This has caused abundant employment; and yet the labourer has not felt the reverse of the times, and, as much under-draining is in progress, we trust their services will be in constant requisition. Just one word on this point. I have read the report of the discussion on subsoil drainage at the Farmer's Club. It is one of the best and most practically useful they have yet entertained. Had some one touched upon dead-level drainage, I should have been better pleased. This is the character of this extensive county, and subsoil-drainage is by no means its leading department of business, and, in many parts of it, not practised. I think the occupiers, however, who neglect such subsoil-drainage, are in great error; and the result of the late discussion confirms this idea. For the most part, the whole district possesses a porous subsoil, and an equally open surface-soil. To subsoil-drain this soil is comparatively inexpensive. The water will drain laterally a long way, and the drains may be shallow—say 2½ feet, and the material thorns on arable, and wedge on grass-lands. I have drained considerably on such soils, and I fearlessly assert that a large proportion of South Lincolnshire may be effectually subsoil-drained at a cost of from 20s. to 30s. per acre: who, then, would neglect subsoil-drainage? But to my report. The grass-lands look like May-pastures, and the stock doing well. Turnips and coleseed hold out fairly, but do not possess any fattening quality, and the sheep progress very slowly. We have abundance of keeping at present. What a retrograde state we are all in! wheat thirty per cent. lower than the highest point since harvest, and other grain nearly as bad! Wool is thirty-five per cent. below its highest point. Store stock of all kinds have gone down in similar proportion. Fat stock still bears a good price, but looks downwards; notwithstanding, we are strongly inclined to believe we have seen the worst. The potato-crop is wofully bad, so no great amount of food can be derived from it. Bread must be the great support, and, as farmers have almost ceased thrashing for the present, the supplies must run short. Fat stock are scarce except porkets. Upon the whole, we do not despond; but as things become a little more settled, we look for a reasonable advance in all farm-produce, and trust that the new-year will be one of the most satisfactory we have known, for this reason—the abundant yield can be afforded at a moderate price; so that the consumer and producer are alike benefited.

WEST GLOUCESTERSHIRE.

The continuance of mild weather since the last report affords but little for comment upon that subject. There has been an increased quantity of rain during the last ten days, but every operation is in such a state of forwardness that no interruption or inconvenience is experienced. The wheat is looking beautiful, perchance too luxuriant; and a check to its vegetating progress will come opportunely, providing it does not occur when the spring is far advanced. Frost would now prove seasonable and acceptable to the land and the stock; for although there are not at present complaints worth notice, the health of animals would be promoted by a more bracing atmosphere. The verdant state of the pastures offers temptations to keeping cattle in the fields, yet the homesteads are far more suitable to their healthy condition. The cold state of the grass at this season of the year, saturated with wet, is not conducive to condition—a most important consideration. This is one of the weakest points in the management of many of the dairy farms in this district. It is too much the custom to keep the stock upon grass as long as there is any for them, with a view to the saving of the hayricks; if it keeps them alive, little respect is paid to their future state, and great loss is sustained in the spring, the early production of cheese runs short, and the middle of summer arrives before the cows supply that abundance and quality of milk that are essential to profit. Nor is it the cows of mature age only that suffer by such treatment; the young stock become emaciated during the winter, contracting too diseases which are oftentimes incurable. It is very gratifying to observe that the potatoes have not gone off in the store-pits to anything like the extent complained of in many parts of the kingdom; this, it may be mentioned, is not an extensive potato growing county—there are few cultivated beyond the requirements of the grower. As yet, no preventive that can be depended upon has been discovered as an antidote to the disease; but the best results appear to be attendant upon the following practice: To work the ground intended to be planted with potatoes in the autumn, or at the latest in October or November, and at the same time apply the manure. Prepare a compost of lime and soil, or lime and vegetable refuse; when the proper season arrives for planting the potatoes, furrows are opened to receive them, and a moderate portion of the compost scattered in the furrows, which are afterwards filled up with the ordinary soil. This method appears to be more successful than using fresh lime. Farm-yard manure placed in the furrows where the potatoes are planted, or artificial manures of any kind, are exceedingly prejudicial. The very early planting of potatoes has been adopted by way of experiment as a preventive of the disease with questionable success; it produces a precocious faculty, which interferes with the important property of keeping. Potatoes planted in February or March will evidently arrive at maturity earlier than those which are planted in April or May. They will consequently send forth their shoots the following spring, at a time conformable with their maturity; and at this period there are many of the early-planted potatoes of last year which have sent forth shoots several inches in length. Continuing to plant them early year after year evidently creates constitutional precocity. The apples appear this year to have caught an infection similar to the potato disease; great complaints are made of their rotting extensively and rapidly in the heaps, before they were made into cyder. This will most probably have an injurious effect upon the beverage; indeed, there is a good deal of it that already tastes tainted. Every succeeding year produces improvements in the exhibitions of fat stock, whether it be at the emporium of hardware, the great metropolis, or in the provincials—so say the reports, and there is no cause to impugn the veracity of them. The splendid shows of Christmas fare fully confirm the high encomiums which have been awarded to the living exhibitions. Adopting the old saw "that the proof of the pudding is in the eating," we will leave those to award the final judgment who are more deeply skilled in gastronomic excellences after the culinary art has been displayed; and hoping that all our friends have enjoyed their Christmas dinners with the fullest measure of epicurean satisfaction, that they will award to the farmer the just meed of praise for his toils, his troubles, and his anxieties. This, upon the whole, has been a prosperous term, for which the agriculturists ought to be truly grateful; and in wishing them a happy new year, we will express a fervent hope that it will be as propitious, or more so, than the past.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BANBURY FAIR.—It was not quite so full as we have seen. However, the quality of the cattle on sale was of the first character. Mr. Brickwell, of Overthorpe, exhibited a splendid ox, which was very generally admired. There was a moderate demand, the average price obtained being about 4s. 4d., although prime beef sold as high as 5s. per 8lbs. Mr. Caless sold by auction, in the fair, four prime Hereford oxen, and one three-year-old heifer, from his own stock, at an average of 35*l*. each. The supply of mutton, though not great, was equal to the demand, and sold from 4s. 4d. to 4s. 8d. per 8lbs. Fat hogs sold from 8s. 9d. to 9s. 3d. per score. There were but few good horses on sale.

BEDALE FORTNIGHT FAIR.—We had a good show of stock, which sold at reduced rates, and a portion unsold. Mutton sheep were well sold. Lean stock and in-calving cows were inquired for, but could not reach the figures they had been accustomed to do, having gone down from 10 to 12 per cent. Beef, 6s. to 7s. per stone; mutton, 5½d. to 6½d. per lb.

LEDBURY FAIR—Was very scantily supplied with all kinds of stock, excepting store pigs, of which there was a good supply. Sales ruled rather dull. Pigs did not realise so much money as at former fairs. Fat cows might be quoted from 6½d. to 7d. per lb.; sheep, 6½d. per lb.

PENRITH FORTNIGHTLY MARKET.—There was a very heavy supply of fat. Prices were down. Sheep fell as much as 4s. or 5s. a-head, and cattle, of which there was a moderate show, were down 2s. or 3s. per stone.

PRESTEIGN FAIR was well supplied with stock of all descriptions. Prime fat cows realised 6d. to 6½d. Lean stock was a drug in the market. Fat pigs may be quoted at 4s. 9d. to 5s. per 12lbs. Small and store pigs about half the price they were twelve months ago. There was a good supply of fat sheep, but prices had a downward tendency.

SHIPSTON-ON-STOUR.—There was a numerous attendance of dealers, with a good supply of stock, both store and fat. Stores fetched low prices, and trade very dull. A number of Irish cattle exhibited for sale were driven away unsold. Beef realized from 6½d. to 7d, and mutton averaged the same price. A pretty brisk trade was done amongst fat stock. On the whole the fair was well attended, and a good deal of business transacted.

SHREWSBURY FORTNIGHTLY MARKET.—The show of stock was more than usually thin, with the exception of pigs, which were penned in large numbers. Beef ranged, according to quality, from 5½d. to 6½d. per lb. Fat calves, in some instances, made 6½d. per lb. Cows and calves, of which there were but few, sold readily. Lean stock met with little demand. Mutton realised from 6¾d. to 7½d. per lb., according to quality. Fat pigs fetched about 5d. per lb.; stores were nearly unsaleable, and much lower in price.

STRATFORD-ON-AVON FAIR.—There was a very good show of fat stock, and a large attendance of buyers; but owing to the high prices asked for beef, trade was very flat, and ultimately lower prices were submitted to, and this caused a clearance of all the beef, which was of first-rate quality. Of store cattle there were but few; of sheep about 800 penned, and these were chiefly sold. We may quote beef and mutton, best qualities, as not exceeding 7d. per lb.

YORK FORTNIGHTLY MARKET.—The supply of all descriptions of horned cattle and sheep was very limited, and the demand equally so; hence the slow sale for both beef and mutton, the former at from 6s. 6d. to 7s. 6d. per 14lbs., and the latter at 6d. to 6½d. per lb. The sale for calving and dairy cows, grazing beasts, and sheep has been exceedingly dull, at prices below former rates.

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

The closing month of the year which has now passed away was remarkable in many respects. The season itself was more like a mild autumn than winter; the grass having continued its growth, as well as esculents, and the wheat plant having attained a vigour quite unusual. Of the earlier pieces, some have become rather winter-proud; and the almost entire absence of frost has encouraged the growth of vermin in some localities: but the weather not only being mild, but dry, the young wheat, as a whole, perhaps, never gave a better promise, while ploughing and all kinds of field work have been prosecuted with scarcely any interruption. Human labour has therefore done its best, and the future must be dependent on the Great Ruler of the times and seasons; but the present prospect is full of hope and encouragement.

The last Monday in November, being the 30th of the month, could not be included in the market statements; but it proved the only cheerful one that could be recorded, as the wheat trade then closed with an advance of 2s. per qr., reducing the month's decline to 2s., instead of 4s., as respected the London markets; but all, and more than all, the improvment was lost on the opening of December, prices then declining 3s. per qr., from which there has been no rally, though no further decline has since taken place. Before the last crop was gathered, stocks were running short; and the averages on the 20th July rose to 63s. 10d., the highest point attained through the year. After the gathering of harvest, when the yield both in this country and abroad was known to be abundant, they gradually declined to 53s. 11d. by the 9th of November; and the fall since then to 49s. 3d. on the last Monday in the year, which is 4s. 8d. per qr., may fairly be attributable to the permitted importation from France, coupled with the almost unexampled crisis in monetary affairs. As the year opened at 59s. 8d., the decline from its commencement to its close is 10s. 5d. per qr.; the lowest point reached being on the 14th of December, viz., 48s. 3d. As to the future, though unlooked-for events have hitherto frustrated all calculations. we cannot but expect a more cheerful state of things when the holidays are passed, and the new year has fairly opened. France, which was so dreaded, can no longer send in shipments either of flour or wheat without a serious loss; and farmers there, with liberty to export, seem no longer inclined to force off their produce. The Baltic may fairly be expected shortly to close by frost, as well as North America; and though heavy arrivals of foreign wheat have been pouring in from the East, sales involve great sacrifices, and prices of Ghirka wheat at Odessa and Berdianski are actually higher than on the London market, while the financial state of the country is rapidly improving; and the serious failure in the potato crop, not felt at present because of the anxiety of growers to quit their stores, and the present liberal foreign imports, must, as spring advances, greatly increase the consumption of wheat, the stocks of which, all over the world, were at the lowest ebb before the new gatherings. The following prices show the state of foreign markets: The best winter red wheat at New York was quoted 41s. to 43s. 6d. per qr. free on board, white to 51s. per qr. Odessa quoted 38s. to 47s. per qr. for Ghirka wheat; sales of the best being made, freight included, in London, at 46s. At Berdianski, prices of soft wheat ranged from 49s. 6d. to 51s. At Taganrog, which is stopped by frost, the quotations were to 37s. 8d. per qr. At Galatz, trade had become so prostrate that prices of wheat had fallen to 25s. for 59s. to 61lbs. per bushel quality. Freights were quoted 11s. per qr. Nothing can be expected thence till spring, when the relative lowness of prices may attract orders, and send them up. Shipments have been making from Danzic and Hambro' with all haste, in anticipation of the set-in of frost. Stocks in store were short; and as supplies arrived, they were placed from the craft on board ship, to save granary expenses. The best high-mixed at the former port was quoted to about 46s. per qr.; prices at the latter were to 44s. 6d. per qr. Stettin quotations were were about 41s. 6d. per qr The mean price of wheat in Belgium was 44s. 4d., fine red at Louvain being held at 45s. per qr. Dutch prices still ranged high, though markets were continually receding, Polish wheat at Amsterdam being still quoted 53s. 4d. The influence of French imports has been most considerable in Spain, where prices have again receded to a moderate scale, though it is expected that the country has not grown enough for its own consumption, notwithstanding some local abundance. At Valladolid wheat was quoted 45s per qr.; flour at Santander, for first quality Spanish having only brought about equal to 44s. 6d. per English sack. At Paris Wheat was quoted to about 43s. per qr., and Flour there to 32s. 6d. per English sack; but the expenses of transit, with duty on both sides and commission, stop consignments on the northern sea-board; where facilities exist to make shipments, the rates leave a loss. Nantes quotes 43s. for wheat, worth only 44s. in London; and wheat in Algiers was of the same value.

The first Monday commenced on the back of moderate supplies of wheat, with but a scanty show for the morning from Kent and Essex; but the weather having been very damp, the samples were much deteriorated in condition, and at the Essex stands fair runs were offered at a reduction of 3s. per qr., with but slow progress. The foreign trade was not equally affected; but to sell, rather less money had to be taken. In the country generally prices were not so shaken; but Bristol, Norwich, Spalding, and Newmarket were 2s. to 3s. per qr. lower, the general reduction being seldom more than 1s. per qr., and Portsmouth was firm. Liverpool on the first market yielded 3d. per 70 lbs., but did not further give way on Friday. London as the week advanced was further depressed, and on Friday appeared to reach the lowest point, the trade seeming quite unnerved, without any accumulation of supplies; but the monetary crisis was, perhaps, the cause of the then depression.

On the second Monday the low tone of the previous market had passed away, though the supplies were rather better, and the rates of the previous Monday were recovered for all really fine dry parcels, which were scarce, but those out of condition were about 2s. per qr. reduced. In foreign there was rather more doing, but somewhat lower prices were taken. The country trade again showed a better feeling than the metropolis; Birmingham, Hull, and Newark were 1s. higher, and Spalding was nearly 2s. improved; and the markets held on Saturday were mostly rather dearer; but Portsmouth, which had been an exception to most other places on the previous week, fell back to the common level. Liverpool advanced 3d. per 70 lbs. on Tuesday; and on Friday a further rise of 1d. to 2d. per 70 lbs. on fine quality took place.

The third Monday, with small supplies from the near counties, was a quiet day, in anticipation of Christmas, good-conditioned parcels being cleared at former rates, though those out of order were placed with difficulty. Foreign was firm. Christmas occurring on Friday, all the country towns partook of a holiday character; but at the markets held, there was scarcely any alteration in prices.

The last Monday was a repeat of its predecessor, there being but a slow steady trade, without any quotable variation either in English or foreign prices, none being anxious to increase stocks at the year's close.

The supplies of wheat for the four weeks of December were as follows: 17,269 qrs. English, and 59,068 qrs. foreign, the weekly average being 19,084 qrs., which is about 4,000 qrs. below November. The exports have been trifling, viz., 200 qrs. wheat, 100 brls. 125 sacks of flour; but the imports into the principal ports of Great Britain in the four weeks were liberal, viz., 429,562 qrs.; the arrivals of November into the United Kingdom were 456,804 qrs. wheat, and 267,159 cwts. flour.

The flour trade, as respects country sorts and foreign, has been in sympathy with wheat, the first Monday receding 1s. per sack, without any further reduction subsequently; Norfolks commencing at 34s., and closing at 33s. per sack; but town samples for first quality have continued unaltered at 47s. per sack. Foreign yielded on the second Monday, on a large supply from America, to the extent of 1s. per brl., the general quality of good western being about 28s. per brl., extra to 30s. per brl. French sold well on the first offers; but lately having left a loss, agents have not been able to sell free on board, and unless markets recede further in the northern ports, the trade must fall off. The imports into London during four weeks, in English sorts from the country, have been 73,578 sks. 31,409 brls. American, and 9,425 sks. principally from France, which has proved little more than half a week's supply from the country. The weekly arrivals have, however, exceeded those of November by 2,813 sks. and 5,203 brls., and the comparative firmness of prices seems rather indicative of an advance.

The barley trade all through the month has been very heavy, the comparative absence of demand for fine malting qualities exciting some surprise, but the slow sale of malt at somewhat reduced rates sufficiently accounts for the neglect, the pressure of the times having lessened the consumption of malt liquor; while the liberty given in France to use grain for distillation, as well as the duty imposed on foreign spirits, has made the inquiry for the medium descriptions very limited. The first Monday had the best supplies, and the market then gave way for all sorts 1s. to 2s. per qr.; the second Monday showed a still duller state of trade for secondary qualities, which sold more in buyers' favour. Towards the month's close, however, there was a rather better demand, with a tendency to improve. The arrivals into London for the four weeks were 17,880 qrs. English, and 59,859 qrs. foreign, which gives an increase over the previous month of about 8,000 qrs. weekly.

Malt has been dull all through December, without much change of value; but 1s. per qr. less was quoted on the second Monday.

The oat trade, with a falling off in the supplies to less than one-half of those in November, has not recovered from the effects of previous gluts, dealers then having liberally stocked themselves, and that without advantage, having felt no inducement at the end of the year to make fresh purchases, though they have had the opportunity to do so on still more moderate terms. The first Monday having a good supply, prices receded 6d. per qr., and though ever since then they have been exceedingly small, there has been no improvement in value; with, however, the certainty of the cessation of Russian supplies, of which the gluts have alone consisted, a deficient crop here, and a not over-abundant one abroad, and less grown in Ireland, we cannot help arriving at the conclusion that as the granaries here get relieved, markets will be rather dearer. The four last weeks show the following arrivals, viz.: of English 1,648 qrs., of Scotch 4,365 qrs., of Irish 3,920 qrs., and of foreign only 74,020 qrs.; making the total weekly supply only 20,987 qrs., against 47,790 qrs. in November.

Beans have declined in the course of the month more seriously than other corn, the English supplies only being moderate; but the foreign were good, and as many are expected from Egypt there does not appear much prospect of a speedy improvement. Almost every market-day has noted some decline. The first Monday was lower 1s., the second 1s. to 2s., the third rather cheaper, and the last again 1s. per qr. down, leaving the top price of Mazagan about 34s., and fine small 40s. per qr. The imports for the month into London were 2,521 qrs. English, and 11,610 qrs. foreign, which being more than double that of the previous month partly accounts for the fall.

Peas have been heavy to sell, and about 1s. cheaper, the change taking place on the first Monday. The comparative scarcity of maples and duns keeps up prices relatively high, but boilers being freely imported remain only on a par with hog-feed, the mildness of the season making the demand unusually small. Should a sharp frost come on, we may see these latter rally, as stocks are not heavy.

Linseed, though cheaper, has not declined at the rate noted in November. The first Monday having an unusual supply gave way 1s. to 2s. per qr., but arrivals since not exceeding an average, the prices have not further receded, though business finished slack. Foreign cakes were less in request, but the limited stock of English, and the preference given to this quality, have served to keep up their value. With the exception of canaryseed, which has given way about 5s. in the month, there has scarcely been any change in the value of seeds. Cloverseed has begun to arrive from America, Germany, and other parts, in moderate quantities, and some English samples have appeared; but though so near the season, buyers have kept entirely on the reserve, money being too scarce for speculative purposes, and the houses in France generally coming best off by realizing prices on their first sales, which have not paid here. English dealers this season appear to prefer a change. Prices in Paris now appear to have reached their lowest; and if business be deferred till the demand ensues, there may be a healthy and profitable trade. Mustardseed has continued at nominal rates. Rapeseed, hempseed, carraway, and coriander, have only been placed in retail at old prices.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter

WHEAT, Essex and Kent, white			new	45	to 54
Ditto, red			,,	43	50
Norfolk, Linc. and Yorks., red			,,	43	50
BARLEY, malting	34	to 36	Chevalier, new	37	40
Distilling	32	34	Grinding	25	29
MALT, Essex, Norfolk, and Suffolk	60	66	extra	—	—
Kingston, Ware, and town made	60	66	,,	—	—
Brown	55	56		—	—
RYE	—	—		30	34
OATS, English, feed	20	23	Potato	25	31
Scotch, feed	20	24	Potato	25	31
Irish, feed, white	20	21	fine	22	29
Ditto, black	19	20	,,	—	23
BEANS, Mazagan	33	34	Ticks	33	34
Harrow	34	35	Pigeon	38	40
PEAS, white boilers .. 40 44 .. Maple	41	43	Grey	39	40
FLOUR, per sack of 280lbs., Town, Households	41s.		fine	42	47
Country	34	35	Households	38	39
Norfolk and Suffolk, ex-ship				32	33

FOREIGN GRAIN.

Shillings per Quarter

WHEAT, Dantzic, mixed	52	—	high do. — — extra	—	56
Konigsberg	47	52	,, — —	—	—
Rostock	48	—	fine 50 —	—	—
American, white	50	52	red 46 50	—	—
Pomera., Meckbg., & Uckermrk, red	46	50		—	—
Silesian, red	45	50	white	50	52
Danish and Holstein				42	47
Russian, hard	44	50	French	(none)	
St. Petersburg and Riga				42	48
Rhine and Belgium				—	49
BARLEY, grinding	24	28	Distilling	32	34
OATS, Dutch, brew, and Polands	21	28	Feed	20	25
Danish and Swedish, feed	20	24	Stralsund	22	24
Russian				20	22
BEANS, Friesland and Holstein				35	36
Konigsberg	31	37	Egyptian	34	35
PEAS, feeding	37	40	fine boilers	40	42
INDIAN CORN, white	34	35	yellow	34	35
FLOUR, per sack, French	42	—	Spanish	—	—
American, per barrel, sour	21	24	sweet	25	29

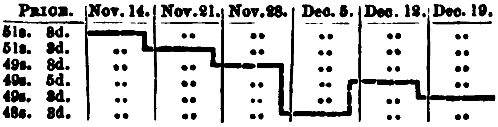
IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
Nov. 14, 1857	51	8	41	3	25	3	34	7	44	9	43	11
Nov. 21, 1857	51	3	39	10	24	1	35	2	43	9	43	3
Nov. 28, 1857	49	8	37	7	23	10	33	10	42	8	40	10
Dec. 5, 1857	48	3	35	9	23	0	32	9	41	2	40	0
Dec. 12, 1857	49	5	36	5	23	3	34	1	41	1	41	2
Dec. 19, 1857	49	3	37	0	22	8	35	7	40	3	40	5
Aggregate average	49	11	38	0	23	8	34	4	42	4	41	7
Sametime last year	61	10	44	8	25	1	40	10	44	11	42	3

COMPARATIVE AVERAGES—1857-56.

From last Friday's *Gaz.*		s.	d.	From *Gazette* of 1856.		s.	d.
Wheat	101,379 qrs.,	49	3	Wheat	108,645 qrs.,	60	5
Barley	96,868 ..	37	0	Barley	105.088 ..	43	10
Oats	9,334 ..	22	8	Oats	12,749 ..	23	7
Rye	97 ..	35	7	Rye	336 ..	40	2
Beans	4,597 ..	40	3	Beans	6,710 ..	42	8
Peas	1,795 ..	40	5	Peas	3,617 ..	40	9

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



MONTHLY RETURN.

AN ACCOUNT SHEWING THE QUANTITIES OF CORN GRAIN, MEAL, AND FLOUR, IMPORTED INTO THE UNITED KINGDOM, AND ADMITTED TO HOME CONSUMPTION, IN THE MONTH OF NOVEMBER, 1857.

Species of Corn, Grain, Meal, and Flour.	Imported from foreign Countries. qrs.	bush.		Imported from British Possessions out of Europe qrs.	bush.		Total. qrs.	bush.	
Wheat	431065	1		25739	3		456804	4	
Barley	100597	1		..			100597	1	
Oats	107294	4		1	4		107296	0	
Rye	21882	2		..			21882	2	
Peas	13685	6		1145	0		14830	6	
Beans	36368	2		..			36368	2	
Maize or Indian Corn	152770	3		0	4		152770	2	
Buck Wheat	10	2		..			10	6	
Beer or Bigg	..			..			..		
Total of Corn and Grain	953673	4		26886	3		980559	7	
	cwts.	qr.	lb.	cwts.	qr.	lb.	cwts.	qr.	lb.
Wheat Meal and Flour	826366	3	18	40792	3	11	867159	3	1
Barley Meal	..			..			..		
Oat Meal	11	1	8	..			11	1	8
Rye Meal	1	0	0	..			1	0	0
Pea Meal	0	1	0	..			0	1	0
Indian Meal	40	1	1	17	1	24	57	2	25
Buck Wheat Meal	14	2	10	0	1	12	14	3	22
Total of Meal and Flour	826434	1	9	40810	2	19	867245	0	0

PRICES OF SEEDS.

BRITISH SEEDS.

TARES, new, per bushel	5s. 0d. to 5s. 9d.
MUSTARDSEED, per bush., new 17s. to —s., brown	13s. to 15s.
CORIANDER, per cwt.	20s. to 30s.
CANARY, per qr.	80s. to 84s.
LINSEED, per qr., sowing —s. to —s...crushing	60s. to 61s.
LINSEED CAKES, per ton	£10 0s. to £11 0s.
RAPESEED, per qr.	68s. to 70s.
RAPE CAKE, per ton	£5 0s. to £5 10s.

FOREIGN SEEDS. &c.

TARES, per bushel	0s. 0d. to 0s. 0d.
HEMPSEED, small, per qr. .... —s. to 44s...Do. Dutch	46s.
CORIANDER, per cwt.	15s. to 25s.
CARRAWAY ,,	44s. to 46s.
LINSEED, per qr., Baltic 58s. to 59s.....Bombay	57s. to 58s.
LINSEED CAKE, per ton	£9 10s. to £10 10s.
RAPESEED, Dutch	76s. to 80s.
RAPE CAKE, per ton	£5 0s. to £5 10s.

POTATO MARKETS.

BOROUGH AND SPITALFIELDS.

LONDON, MONDAY, Dec. 28.—Very moderate supplies of home-grown Potatoes have come to hand since Monday; but the imports from abroad have been liberal, viz., 420 tons from Antwerp, 5 tons from Boulogne, 80 tons from Havre, 800 tons from Dunkirk, 517 tons from Rouen, 145 tons from Dieppe, 85 tons from Nieuport, 122 tons from Ostend, 4 tons from Hamburgh, and 5 tons from Rotterdam. The demand for all kinds is still very inactive, as follows:—

York Regents	140s. to 160s.	per ton.
Kent & Essex do............	120s. to 140s.	„
Scotch	80s. to 120s.	„
Do. Cups	75s. to 85s.	„
Middlings	50s. to 60s.	„
Lincolns	80s. to 120s.	„
Foreign....................	55s. to 65s.	„

SOUTHWARK WATERSIDE, MONDAY, Dec. 28.—During the past week the arrivals both coastwise and from abroad have been limited, but quite equal to the demand. Trade is very dull, at the following quotations:—

Lincolnshire Regents	60s. to 120s.	per ton.
Perth, Forfar, and Fifeshire do.	90s. to 110s.	„
Ditto ditto reds ..	60s. to 70s.	„
French Whites	70s. to 80s.	„
Irish do....................	70s. to 80s.	„
Belgian do..................	60s. to 70s.	„
Dutch Reds	80s. to 90s.	„

COUNTRY POTATO MARKETS.—YORK, Dec. 19: Potatoes sell at 11d. to 1s. per peck, and 3s. to 3s. 4d. per bush.—LEEDS, Dec. 22: A fair supply of Potatoes, which sold at 14d. to 15d. per 21lbs. wholesale, and 15d. to 16d. retail.—MALTON, Dec. 19: A poor supply of inferior Potatoes sold at 12d. per peck.—THIRSK, Dec. 21; Potatoes 8d. per st.—RICHMOND, Dec. 19: Potatoes 4s. per bush.—MANCHESTER, Dec. 22: Potatoes 10s. to 15s. per 252lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland..................	116 to	124	Cheshire..................	66	76
Kiel.......................	112	126	Cheddar...................	72	82
Dorset	112	124	Double Gloucester.........	58	64
Carlow.....................	90	104	HAMS:—Old	102	106
Waterford..................	94	100	York, new.................	86	92
Cork, ...	94	106	Westmoreland	90	100
Limerick	88	98	Irish, new	80	90
Sligo......................	90	100	BACON: Wiltshire, dried	58	62
FRESH, per dozen..	13s. 0d. to	16s. 0d.	Irish, green	50	54

ENGLISH BUTTER MARKET.

LONDON, MONDAY, Dec. 28.—We report a very slow trade, at declining prices, except for fine qualities.

Dorset fine	per cwt.	124s. to 126s.
Ditto, middling................		90s. to 100s.
Fresh............	per doz. lbs.	11s. to 16s.

BELFAST, (Thursday last.)—Butter: Shipping price, 89s. to 105s. per cwt.; firkins and crocks, 9d. to 10½d. per lb.; Bacon, 49s. to 53s.; Hams, prime 70s. to 76s., second quality 60s. to 66s. per cwt.; prime mess Pork, 85s. per brl.; Pork, 38s. to 45s.; Beef, 120s. to 130s. per tierce; Irish Lard, in bladders, 72s. to 76s.; kegs or firkins, 64s. to 66s per cwt.

LONDONDERRY, (Thursday last.)—This week, supplies not so large as last; but the demand being quite dull prices remained unchanged, and the few sales made were at very irregular rates—firkins, second 10d. to 10½d., third 9d. to 9½d., fourth 8d., fifth 7½d.; butts, fine 1s. 0½d. to 1s. 1d., good 11d. to 11¾d., middling 10d. to 10½d. per lb.

CHICORY.

LONDON, SATURDAY, Dec. 26.—Both English and foreign Chicory continue to move off slowly, but we have no actual decline to notice in prices. The supplies on offer are tolerably extensive.

ENGLISH, per ton	£0 0 to	£0 0	HAMBURG	£11 0 to	£11 1
HARLINGEN....	10 10	11 0	BELGIUM	10 15	11 10
FLANDERS......	0 0	0 0	GUERNSEY	10 15	11 0

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, Dec. 28.—Although money has become easier in the discount market, there is no disposition shown to purchase any kind of English wool. The supply of late has rather increased; but we do not anticipate any further reduction in prices, even though large quantities of colonial wool continue to be returned from the United States.

Per pack of 240lbs.

Fleeces—Southdown Hogs............	£17	0 to	£18	0
Do. Half bred Hogs	16	0	00	0
Do. Kent	15	0	16	0
Do. Southdown Ewes and Wethers	15	0	16	0
Do. Leicester do.	15	0	16	0
Sorts—Clothing, picklock	19	0	20	0
Do. Prime and picklock	18	0	00	0
Do. Choice........................	17	0	00	0
Do. Super.........................	16	0	00	0
Do. Combing—Wether matching ...	18	0	19	0
Do. Picklock	16	0	17	0
Do. Common	14	0	15	0
Do. Hog matching	19	10	20	0
Do. Picklock matching.............	18	0	00	0
Do. Super do:	15	0	00	0

FOREIGN WOOL MARKET.

Per lb. Duty Free.		s.	d.		s.	d.
German, Saxon, and Prussian.	1st and 2nd Elect	3	4	to	4	6
	Prima	2	4		3	0
	Secunda	2	0		2	4
	Tertia	1	8		1	10
Australian & V.D. Land—Combg. & Clothg		1	2½		1	8
Do. Lambs		1	4		2	1½
Do. Locks and Pieces		0	10		1	7
Do. Grease		0	8½		0	9
Do. Skin and Slipe		0	8½		1	9
S. Australian & S. River—Combg. & Clothg		1	8		2	2½
Do. Lambs		1	4		1	9½
Do. Locks and Pieces		0	7		1	2½
Do. Grease		0	9		0	11½
Do. Skin and Slipe..................		1	4		1	5
Cape—Average Flocks.................		1	11		2	0
Do. Combing and Clothing		0	8		1	10½
Do. Lambs...........................		0	11		1	10½
Do. Locks and Pieces................		0	10½		1	6½
Do. Grease..........................		0	7½		1	3

MANURES.

PRICES CURRENT OF GUANO, &c.

PERUVIAN GUANO, (per ton, for 30 tons) nominal	£1 5 0	to	£0 0 0
Do. Do. ....(under 30tons)....	14 0 0		0 0 0
BOLIVIAN GUANO ....none	0 0 0		0 0 0

ARTIFICIAL MANURES, &c.

Nitrate Soda (per ton)...	£22 0 0	to	£23 0 0
Nitrate Potash or Saltpetre	29 0 0		30 0 0
Sulpht. Ammonia	21 0 0		29 0 0
Muriate ditto...	27 0 0		28 0 0
Superphospht. of Lime....	6 0 0		0 0 0
Soda Ash, or Alkali......	0 0		10 0 0
Gypsum.........	2 0 0		2 10 0
Coprolite.......	3 15 0		4 0 0

	£ s. d.		£ s. d.
Sulph. of Copper or Roman Vitriol, for Wheat steeping.......	45 0 0	to	47 0 0
Salt	1 5 0		2 0 0
Bones, Dust, per qr.	1 5 0		1 6 0
Do. ½-inch......	1 4 0		1 5 0
Oil Vitriol, concentrated, per lb........	0 0 1		0 0 0
Do. Brown.....	0 0 0½		0 0 0

OIL-CAKES.

Linseed-cakes, per ton—			
Thin American, in brls. or bags	£10 15 0		£11 10 0
Thick do. round	10 5 0		0 0 0
Marseilles (none)	£0 0 0	to	£0 0 0
English..........	10 10 0		11 0 0
Rape-cakes, pr ton	6 5 0		6 10 0

JOHN KEEN, 35, Leadenhall-street,
(Late Odams, Pickford, and Keen.)

Williams & Co., 24, Mark Lane—Azotic............................£6 10 0

Manufactured by Hodgson & Simpson, Wakefield, and Matthews & Co., Driffield.

Ammonia-Phosphate and Nitro-Phosphate..................	per ton	£8 0 0
Superphosphate of Lime	„	7 0 0

Agricultural Chemical Works, Stowmarket, Suffolk.

Prentice's Cereal Manure for Corn Crops..................	per ton	£8 10 0
Prentice's Turnip Manure	„	7 0 0
Prentice's Superphosphate of Lime	„	6 10 0

Lancashire Manure Company, Widnes, near Warrington.

J. Knight & Co.'s Nitrogenized Bone Manures............per ton £8 15 0

Manure Works, Grovehill, Beverley.

Tigar & Co.'s Celebrated Turnip Manures................per ton £7 10 0

END OF VOLUME XLVII.

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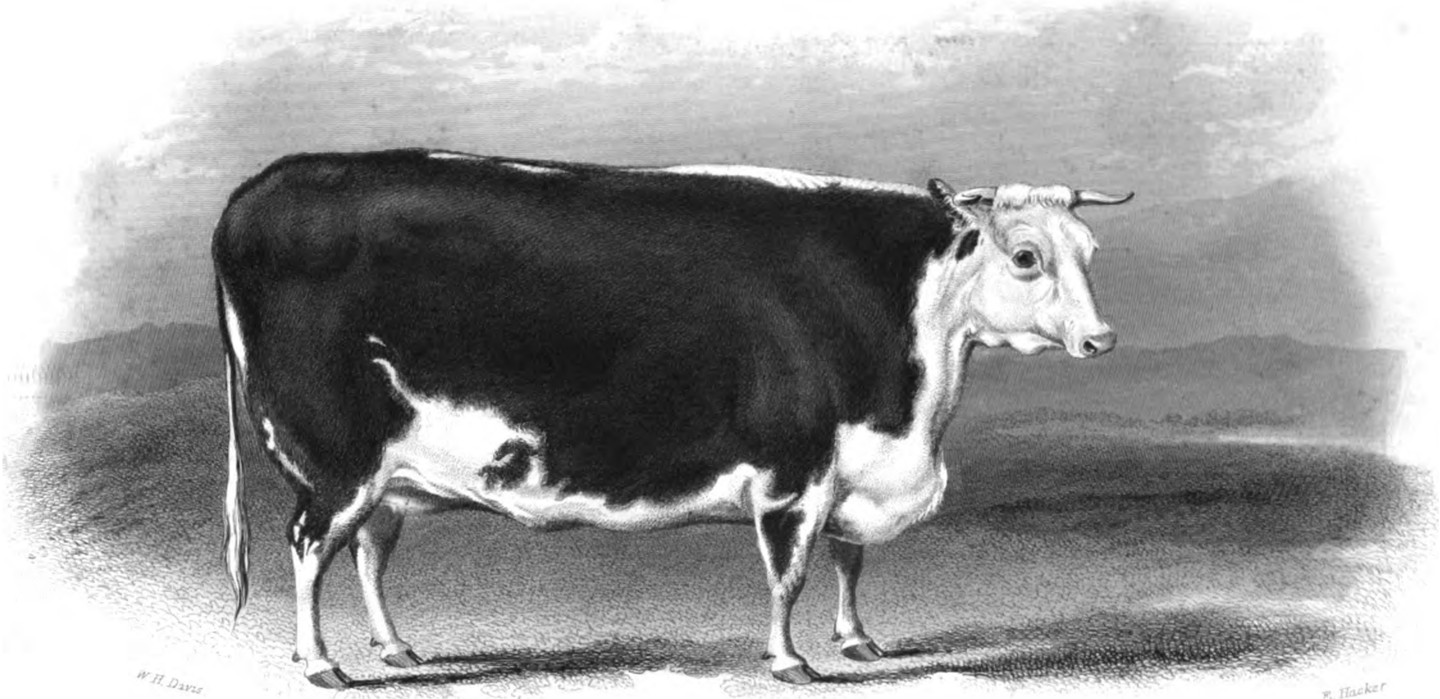
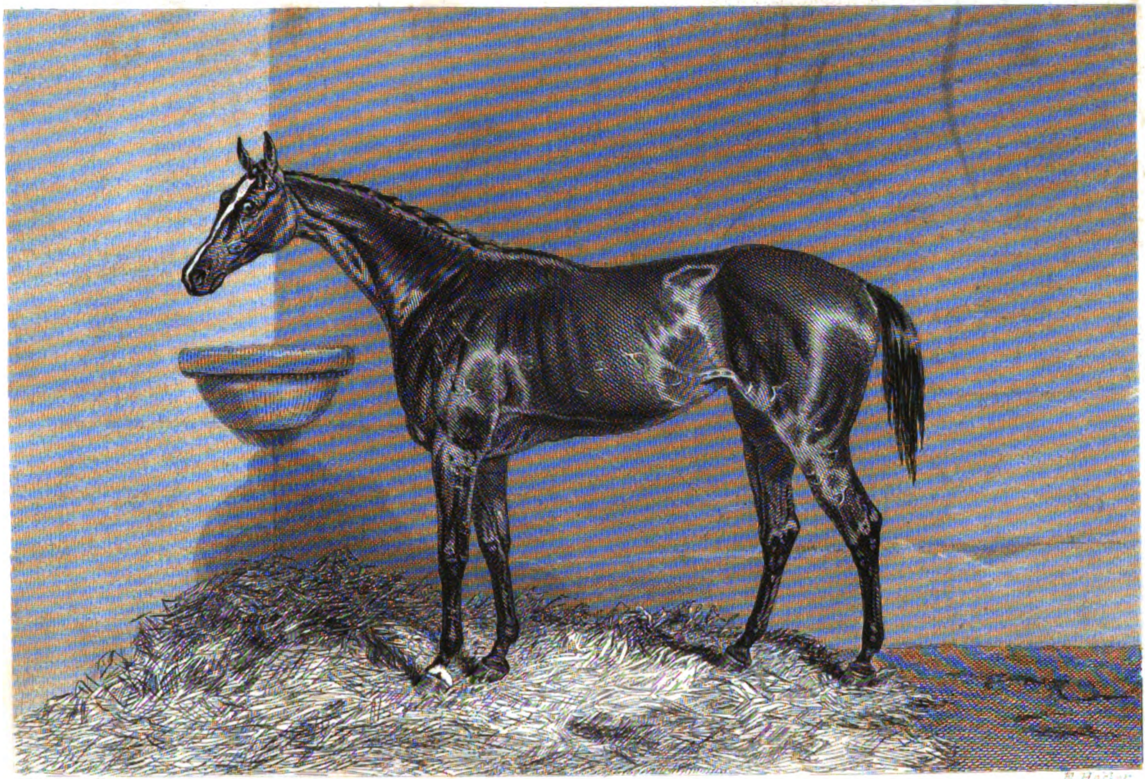


W. H. Davis E. Hacker

A Hereford Heifer.

The Property of Mr. George Pitt of Chadnor Court, Dilwyn, Leominster, for which the [illegible] and [illegible] Medal as best Cow or Heifer in the Yard, were awarded at the [illegible] December [illegible]

London Published by Rogerson & Tuxford 246 Strand [illegible]



Harry Hall Newmarket

E. Hacker

Blink Bonny.

Winner of the Derby and Oaks [illegible]

London, Chapman & Hall, [illegible]

THE FARMER'S MAGAZINE.

FEBRUARY, 1858.

PLATE I.

A PRIZE HEREFORD HEIFER.

This heifer, bred and exhibited by Mr. George Pitt, of Chadnor Court, Dilwyn, was by Whitenot (1116), dam Pretty-Maid the Second, by Northampton (600). She took, at the Birmingham Show, December, 1856, the first prize of Ten Sovereigns as the best of her class, and the GOLD MEDAL as the best cow or heifer of any breed in the exhibition; Mr. Pitt also receiving a Silver Medal as her breeder.

Proceeding to London, she took, at the Smithfield Club Show, the second prize of Five Sovereigns for Hereford Heifers. She was sold here, to kill, to Mr. J. M. Smith, of Westbury, Wilts, her dead weight was 17 score per quarter.

This heifer also took in her time the following premiums at local meetings:—at Ludlow, in 1854, Five Sovereigns as the best yearling heifer; and in the same year at Leominster, a Silver Cup. In, 1855, at Tredegar, a Silver Cup as the best two-year-old heifer. In 1856, Five Sovereigns, at Ludlow as the best fat cow or heifer; a Silver Cup at Leominster; and another Silver Cup at Hereford; her winnings in all being seven first prizes, and one second.

This heifer, says our own report of the meeting, was quite a wonder in her way as a fat animal. Although somewhat small in frame, she was very remarkable for her perfect proportions, fine head and bone, and prime quality of flesh. She had, too, an extraordinarily good breast, with capital twist, and stood short on the leg. Mr. Pitt, indeed, may well plume himself on being the breeder and feeder of such an animal.

PLATE II.

BLINK BONNY; WINNER OF THE DERBY AND OAKS, 1857.

Blink Bonny, bred by her present owner Mr. W. I'Anson, at Spring Cottage, Malton, in 1854, is by Melbourne, out of Queen Mary, by Gladiator, her dam, by Plenipotentiary, out of Myrrha, by Whalebone.

Melbourne, bred by the late Mr. H. Robinson in 1834, is by Humphrey Clinker, out of a Cervantes mare. He was a good honest race-horse; and, though but roughly prepared, won many heavy stakes against superior fields of horses. As a stallion he ranked unquestionably as the best we have had in this country for many a long day.

Queen Mary, bred by Mr. Dennis in 1843, was put to the stud at three years old. Her first foal was a good filly called Haricot; in 1848 she had a dead foal to Mango; in 1849, Braxey, by Moss Trooper; in 1850, Balrownie, by Annandale; in 1851, a half-bred colt; in 1852, Blooming Heather, by Melbourne; in 1853, Bonnie Scotland, by Iago; in 1854, Blink Bonny; in 1855, she missed to Touchstone; in 1856, Balnamon, by Annandale; and in 1857, Bab-at-the-Bowster, by Annandale. On the decease of her owner, Mr. Ramsay, Queen Mary was sold to the late Mr. Carnegie, of Balnamon; but subsequently repurchased with Braxey and Balrownie at her side for £110. Queen Mary never ran but once, when she was not placed for a two-year-old stake at Chester.

Blink Bonny is a bay mare, inclining in parts to what artists would call a "negative" colour. She stands fifteen hands two inches and a-half high; has a very blood-like lean head, with wide ears, and also great width between the eyes, which are very prominent. She has a strong arched neck, cleanly set into her head; splendid shoulders, good chest, and great depth of girth—being very thick through the jockey's knees. She has immense ribs, a high rump shortening towards the tail, powerful thighs and gaskins, with good bone, hocks, and knees, and short pasterns. Blink Bonny has a blaze of white in the face, giving her quite a family likeness to her famous half-brother West Australian, and a white fore coronet. She has a capital temper, being extremely temperate and docile, while on the other hand she has unfortunately but a thin switch tail, and at the best of times but a roughish dull coat. Making their estimate by these important points, she has been declared by many, who seem to have entirely forgotten her really beautiful head and splendid forehand, to be but a hackney-looking mare. For our own part we have seen few who showed more signs of blood.

THE TURNIP PLANT.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The growth of the turnip plant during the season of 1857-58 has presented to us facts of considerable interest. The periods of long continued drought, followed, during that brilliant summer, by copious rainfalls and a high temperature, have caused the turnips, in most districts, to grow in a very unusual manner. The bulbs, in the instances to which I refer, have grown in *length* to a very irregular extent; but this has not been attended with a corresponding enlargement of the diameter of the bulb. They have commonly extended above the surface of the soil about eighteen inches: these more resemble, in their above-ground shape, the ordinary mangold-wurzel or carrot than the turnip plant. Unfortunately, this morbid growth has been attended with a very extensive diminution of the nutritive properties of the bulb; the stock eat it with reluctance; it seems to possess little or no fattening properties.

Various reasons have been produced to account for the phenomenon. The blame has been sometimes laid upon the seed employed; in other cases, the loss experienced has been attributed to the use, for the turnip crop, of certain well-known artificial manures. To neither of these causes, I believe, can be truly assigned the malformation. I have found, upon extended inquiry, that the elongated turnips have been produced to an equal extent by the plants produced from seed procured of different merchants, from different counties, and from seed ripened on the farm on which it was sown. The seed, then, we may fairly conclude, has had little or no influence in the matter. Then, as regards the use of artificial manures, I find that these long-rooted turnips have been produced to an equally injurious extent on land dressed with farmyard compost only, with farmyard dung and superphosphate of lime, with Peruvian guano and superphosphate of lime, used alone or employed together on the turnip soils of Norfolk and Bedford, Surrey and Dorset, and on lands which have and have not been marled or chalked. We have not, therefore, any reason to believe that the use of any particular dressing has had any influence whatever in the case.

It is ever our fate, indeed, when we are studying the diseases or the growth of plants, to meet with—to be haunted with—suspicions and baseless conclusions, not much more wise than those which bewitched our forefathers. Ever and anon we hear grave suspicions hazarded that the mortality of our sheep is increased when fed on roots grown with artificial manures: the use of sprats in this way has conjured up opinions of this kind. Peruvian guano and superphosphate of lime have been sometimes held to render the turnip less wholesome for the flock. With every effort which I have made to procure reliable evidence on this subject, I have always found that these kind of suspicions could not be rendered more conclusive; they rested, in fact, on the most vague of surmises. The comparative analyses of turnips grown with a variety of manures show that the turnips grown with artificial dressings do not vary materially in composition from the turnips grown with only farmyard dung: the same chemical matters are found in each. Way, Voelcker, Nesbit, and others, all concur in this conclusion. Dr. Anderson's trials were perhaps the most valuable, because the turnips he examined were grown on three kinds of soil, and had been dressed with seven different manures. We can at this time recur to these valuable researches with considerable advantage. For the sake of a more ready comparison, I will give the results obtained by the Professor in the same tabular form to which I have elsewhere reduced them.

In the following table, then, column I. gives the soil and crop; II., the water in 10,000 parts; III., the nitrogen in the fibre; IV., the nitrogen in the juice; V., the phosphates. The turnips were grown on the property of Lord Kinnaird, in Perthshire. The clay soil is the heavy alluvial clay of the Carse of Gowrie, which is a wheat soil of the best description. The hill land is a light loamy soil, of an entirely different character from the Carse clay, and lets at a much inferior rent. The black land forms the boundary between the two former, and partakes of the character of both, those of the clay, however, preponderating :—

I.	II.	III.	IV.	V.
Swedes in 1849.				
Clay land........	9058.0	2.9	12.9	16.0
Black land........	9878.0	4.0	14.2	17.6
Hill land	8712.0	1.7	26.8	15.9
Swedes in 1850.				
Clay land........	9273.0	3.7	8.6	9.6
Black land.......	9278.0	4.0	5.9	9.0
Hill land.........	9278.0	4.5	10.2	9.8
Aberd'n yellows, 1849				
Clay land........	9119.5	3.6	15.9	16.2
Black land.......	9047.8	3.8	13.7	16.7
Hill land	9057.8	3.9	24.4	13.3
Aberd'n yellows, 1850				
Clay land........	9426.3	3.1	7.8	6.8
Black land.......	9059.0	2.9	13.8	12.1
Hill Land	9399.0	3.4	12.0	12.0

In the two next tables will be found the results of some very interesting experiments made with yellow turnips, at Lord Kinnaird's farm of Millhill. The different turnips were all manured with 16 tons of farmyard manure, valued at £4, and had, in addition, quantities of different auxiliary manures. This table gives the number of the experiments and the manure, omitting Nos. 4 and 5, since, owing to the failure of the crops, no analyses of these turnips were made :

0. 16 yards dung.
1. 4 cwt. White's manure.
2. 2 cwt. guano, 2 cwt. salt.
3. 3 cwt. guano.
6. 3 cwt. London Manure Co.'s manure.
7. 4 cwt. superphosphate.
8. 3 cwt. guano, 1 cwt. superphosphate, diluted with 200 gallons water.
9. 3 cwt. superphosphate, diluted with 200 gallons water.

In the following table, column I. gives the number (referring to the preceding table) of the experiments, II. the quantity of water found in 10,000 parts of the turnip, III. the ash, IV. the protein compounds, V. the fibre, sugar, &c., and VI. the nitrogen found in these differently-manured turnips. No analyses were made of Nos. 4 and 5, as the gain was not equal to the cost of the manures :—

I.	II.	III.	IV.	V.	VI.
0........	9327.0	39.6	83.8	549.6	13.2
1........	9287.0	67.0	63.5	482.5	10.0
2........	9411.0	55.0	68.5	465.5	10.8
3........	9345.0	58.0	82.5	514.5	13.1
6........	9285.0	76.0	95.8	543.2	15.5
7........	9243.0	59.0	73.0	625.0	11.0
8........	8862.0	75.0	117.4	945.0	18.5
9........	9509.0	56.2	41.3	399.5	6.5

It would seem, therefore, that there is not such a difference in the composition of the turnip plant grown by different manures, as to lead us to conclude that any injurious results would ensue from them to the stock.

There is no doubt considerable results are to be obtained from small variations in the *mode of applying* the same kind of food. We have an instance of this in the good effect of slicing or of pulping turnips, a very useful report on which, by Mr. J. M'Laren, of Rossie, will be found in the last number of the "Transactions of the Highland Society of Scotland," p. 153. His trials were made in 1855-56 and 1856-57, with six cattle fed on whole turnips; six fed on pulped turnips, mixed with cut straw, and given fresh; and six fed with pulped turnips, mixed with cut chaff, and allowed to ferment for forty-eight hours. From the results of these trials he fairly enough draws the conclusion, "That, although there has been some variation as to the largest increment, this season, it being on the lot consuming unfermented pulp, whilst last year these were much in arrear, still the general result has been that the pulping of the turnips is a saving of the root in feeding cattle. At the same time, it is not to be forgotten that, in a feeding experiment, much depends on the accident of a well or an ill-feeding beast being in one or other of the lots. It is, indeed, almost impossible to find any two animals feed alike, however well selected or attentively looked after; still the average of six cattle in each lot should give a pretty fair test to judge by; but one set of trials can hardly be held to be conclusive in determining either success or failure of any system." The following were the results obtained in 1855-56:—

	Weighed			
	Oct. 18, 1855.		Mar. 1, 1856.	
	cwts.	lbs.	cwts.	lbs.
6 fed on pulped turnips, mixed with chaff, and fermented	70	14	82	28
6 fed on whole turnips	70	24	81	77
6 fed on pulped turnips and chaff, given fresh	70	70	81	14

Upon repeating the trial in 1856-57, with the same kind of short-horned steers, the

	Weighed			
	Nov. 8, 1856.		April 9, 1857.	
	cwts.	lbs.	cwts.	lbs.
6 fed on whole turnips and straw..	54	54	75	0
6 fed on pulped turnips, given fresh, mixed with chaff	54	68	79	28
6 fed with pulped turnips, mixed with chaff, and fermented......	54	28	78	7

After making all the necessary deductions, he found the profit from feeding these different lots in 1856-57 was

Lot 1	£15	17	4
„ 2	23	15	10
„ 3	22	14	4

The successful growth of the turnip, indeed, is one of the most important of the farmer's many anxious efforts: anything, therefore, which adds to his stock of manure for this root, adds, in fact, almost directly to the food of his live stock. I have long urged upon their attention the collection, for this purpose, of the couch and other weeds, which ever follow, as it were, the plough on all arable soils. I have reminded them from year to year of the valuable compost produced by collecting these into heaps, and mixing them with copious dressings of common salt or lime. By this process, a very considerable amount of the organic matters of the weeds, which are usually lost in burning, is restored to the soil. Even the ashes or mineral substances of these weeds contain valuable fertilizing matters. All the weeds from an inferior turnip soil, when collected and burnt in a heap, yielded a considerable portion of ashes. These ashes, when analyzed, were found to contain of

Potash	8.6 per cent.
Soda	4.2 „
Lime	15.1 „
Phosphoric acid	10.9 „

Being aware of these things, it was with much pleasure that, on a recent occasion, near Ipswich, I noticed some noble teams of those Suffolk-punch horses drawing waggon-loads of salt out of the town. Upon my asking one of the waggoners what these lots of salt were intended for, he informed me in the interval between a "Gee whoi!" and a whistle, "We puts it on to the spear-grass."

Upon a subsequent occasion, I found one of these huge gatherings of weeds carted and neatly dressed, and shaped like an ordinary compost heap, pressed pretty solid by the action of the cart and horses, and copiously covered with salt. Here I felt was indeed the making the most of uninvited, unwelcome visitors—robbers of the food intended for better and more honest plants. Of the compost thus prepared, I find that it is deemed by these skilful Suffolk farmers to be useful for all root crops; and although I could not find that it had been used in any *comparative trials* for mangolds, still I cannot but conclude that, from the salt and other matters which it contains, it must be a powerful manure for this valuable and increasingly-cultivated root.

Such are a few only of the practical movements in the growth and use of the turnip crop, which have occurred during the last few months. The retrospect adds fresh evidence not only of the many mysterious and injurious affections—not to say diseases—of our cultivated crops, but is also suggestive of the certain fact, that not only is something considerable yet to be generally accomplished in the collection and preparation of home-made manures, but that when, after escaping loss of plant, diseases, malformations, and stunted growths, the bulbs are fairly stored—that, after all, something profitable is yet to be ascertained relating to the consumption of them by our stock.

THE ROYAL AGRICULTURAL IMPROVEMENT SOCIETY OF IRELAND.—The Waterford local committee have placed at the disposal of the Society a Challenge Cup, value one hundred guineas—to be competed for at every annual meeting: "for the best lot of three short-horned animals—bulls or heifers, but not in mixed lots—not exceeding 20 months old, having been bred by the exhibitor, and *bona fide* his property. Animals specially entered for this prize not to be disqualified from competing for the premiums offered for their section in the short-horned bulls."

WHAT SHALL WE DO WITH OUR SPROUTED WHEAT?

In the sales made in the Edinburgh Corn Market of Nov. 25, I observe that of the 667 quarters wheat sold, just one-half—say 332 quarters—were sold at prices varying from 23s. 6d. to 36s. per quarter, while other 108 quarters were sold at from 36s. to 40s. The first 332 quarters we may safely assume to be grain which had been exposed to the September's rain, and had become so sprouted as to be unfit for human food. The 108 quarters we may consider as having been also exposed to the same storm, but to have escaped with less damage, and to be fit for mixing with fine wheats for the manufacture of second bread and biscuit.

This proportion of 440 damaged out of a total sale of 667 quarters will, I believe, represent the average state of the wheat crop through the eastern counties of Scotland, and the northern ones of England.

The sale by farmers of the qualities bringing 36s. to 40s. is, perhaps, the best way of turning them to account; but it is matter of serious consideration whether the portion so deteriorated as to fetch but 23s. to 36s. could not be more advantageously turned to account on the farm.

There have been but few experiments made with wheat as a feeding substance for animals; indeed, I can find no record of any such experiment, the reason being that for several years past, during which the attention of scientific and practical men has been drawn to the comparative values of different articles for stock feeding, the price of wheat has been so high, and, until 1856, its quality so good, that it would have been thought madness to apply this "nobler grain" to any other purpose than the supply of the bakers and their millions of customers. But two disastrous harvests have flooded Scotland and Northern England with damaged wheat, of the type sold as above in the Edinburgh market; and we may take it for granted that, behind even that poor display, there are many quarters still more deteriorated. *What shall we do with them?*

In comparing the composition of wheat with other grains, on the data given in Johnston's *Elements of Agricultural Chemistry* (sixth edition, pp. 340 and 341), I find the following results—

	Sugar, Starch, &c.	Gluten, &c.	Oil.
Wheat, in each 100 lbs.	55	12	3
Barley „	60	13	2.75
Oats „	50	14.5	4.8
Beans „	40	26	2.5
Oilcake „	39	22	12

This places wheat in no disadvantageous light as compared with the other grains for meat-producing qualities. The effect of sprouting would be rather favourable than otherwise, as it would change a portion of the starch into sugar; the latter more easily assimilated by the animal; while the *diastose* formed during germination is believed, as in the case of malted barley, also to add to the solubility and nutritiveness of the food.

These are *theoretical* recommendations of sprouted wheat as a food for live stock. They place it at least on a par with barley, which has been largely used for that purpose, when at a price exceeding that at which the wheat described is at present sold. There may, however, be *practical* objections; and my design, in calling the attention of yourself and your readers to the subject, is to elicit these objections, if there be any.

Would you, therefore, state your own opinions on the subject, and invite your correspondents to consider and discuss it also? S.

NOTES ON NEW IMPLEMENTS AND MACHINES EXHIBITED AT THE SMITHFIELD CLUB SHOW OF 1857.

Once more have we encountered the confusion and the crush of the implement galleries of the Baker-street show. Right pleasant was it, nevertheless, in spite of all the disadvantages attendant thereupon, to witness the interest taken in the mechanism displayed, by burly farmers and well-to-do agriculturists. Nor less pleasant was it to be informed, amidst the crush of commercial combinations, and the gloomy forebodings of "cotton men," and men of other substances nameless here, that something more than a passing interest was taken, as was evidenced by the comparatively well-filled "order books" of some of our leading firms. Truly, in their quiet unostentatious progress, and in their freedom from the shocks of panics and the untoward turns of trade, our agriculturists have little need to envy the position of their commercial brethren. In view, however, of the rising importance of the implemental department of the show, fast treading on the heels of its more imposing rivals, one could not help—amidst the bustle and the buzz which prevailed—feeling it to be a pity that the expansive capabilities of the space for exhibition were not coincident with those of the exhibition itself, and that something could not be done to have it held in some place commensurate with its importance. The present galleries *may* be termed places for the *exhibition* of implements and machines; places for their *examination* in no wise are they. The close proximity in which the machines were *huddled* together was subversive of all attempts at examination of their details of construction or principles of arrangement; indeed, the feeling raised by a survey of the various "stands"—so called, we suppose, on the principle of *lucus a non lucendo*—was surprise at the ingenuity which could, in such limited spaces, cram so many and such bulky articles.

The time has gone by, when the farmers were satisfied with a mere look at implements and machines; passing them over, as if careless of their uses to them; or if purchasing them, doing so on the faith of the opinion of some friend, or the statements of the manufacturer. By the gradual increase in the number and in the importance of the objects of our agricultural shows, we have been educating the farmer in the uses and value of mechanism; and, no longer dead to the aid which it can afford him in his various operations, he is anxious to see new things, and careful to examine their claims to support. Hence arises the value of well-ordered exhibitions, in which every facility is granted to examine the details of all machines there exhibited. And hence also arises the value of well-arranged catalogues, in which the various machines manufactured by the several firms shall be clearly, that is mechanically illustrated and described. We of course refer to the trade catalogues issued by the respective firms not to the catalogues issued by the show or shows at which their machines are exhibited. In view of the advantages of a catalogue in which mechanical descriptions and accurate detailed illustrations would be given, it is certainly curious that no firm, so far as we know, has yet brought out one in which this species of information has been displayed so fully as the importance of the subject demands. The advantages obtained by the use of such catalogues would be as much on the side of the manufacturer as on that of the purchaser. Makers of manufacturing mechanism in our cotton districts know this well; and although they do not issue catalogues in the manner of our agricultural implement makers, still, when they have anything new to bring before the notice of the manufacturers, they take care in their circular or prospectus to illustrate mechanically and describe clearly the details of their invention and the principle of its operation. And this they do, knowing that the parties who may be the purchasers are well acquainted with the operation of the machine which the new candidate for their favour is designed to supersede; and that consequently what the manufacturer wants is information which can enable him to decide in what respect the new machine is calculated to do better work than the old, or how the machine presented to his notice by one maker is better than that brought forward by the rival trader. Are the machines or implements used by the farmer, because they are less costly or complicated than manufacturing mechanism, less important to him? or is he presumed to be indifferent to their details of construction, or principle of operation? or is it supposed that he cannot understand or appreciate mechanical description? These questions we do not venture to answer; but true it is that the more facilities are thrown in his way to understand fully the nature and operation of the mechanism which he is desirous to buy, the more readily will he become a purchaser. We have said that the time has gone by when the intelligent farmer will be satisfied with a bare look at machinery; a thorough examination alone satisfies him: and the more readily the manufacturer throws facilities in his way for this thorough examination, the more will they find it redound to their own interest. It is impossible to overrate the uses of well-arranged catalogues in enabling farmers to examine quietly, and at their leisure the peculiarities of machines which may have attracted their attention at the shows which they may have visited. It is easy to conceive what close attention would be given to the detailed descriptions of a machine which a visitor and an intending purchaser *saw*, but could *not examine*, midst the crush and confusion of the Baker-street show. We have ventured thus far to detain our readers with remarks on this subject, because we conceive it one of considerable importance, and because we happen to know that with many practical agriculturists it would be a matter of congratulation if they were enabled to examine leisurely the construction and operations of machines in which they felt an interest.

Not longer to keep back the more immediate subject of our paper, we proceed to notice a few of the new, or comparatively new, implements and machines exhibited, following as closely as possible the natural order in which the agricultural mechanism is used in practice, beginning with cultural implements, and ending with the mechanism used for the preparation of food for stock.

(1.) In the department of cultural implements we have little new to notice. Mr. E. Clarke, of Great Badley, Essex, exhibited a "furrow-opener and slide," invented by Mr. Wm. Delfe. The cultivating part of this implement bears a resemblance to "Bentall's broad-share;" and the lever movement by which it is raised, when it reaches the end of the stetches at the head-lands, is a modification of that used in Garrett's horse-hoe. The implement is supported in front by a small wheel, and at the rear end of the frame or beam by two wheels of larger diameter. These wheels have their bearings at the extremities of two levers, jointed near their centre to the beam of the implement. The free ends of the lever are continued upwards, and passed through the slots of two curved or segmental guides, provided with holes and a catch-pin, by which the levers are kept in any desired position. Chains are connected to the upper extremities of the levers, and carried over and fixed to the peripheries of two eccentric wheels, keyed on to a shaft working in bearings supported on the outer extremities of two curved brackets projecting from the ends of the beam. The stilts or handles of the implement are placed between these brackets; and a cross handle, attached to the shaft bearing the eccentric wheels, is thus placed easily within the reach of the attendant. By turning this cross-handle in one direction, the chains are wound round the peripheries of the eccentric wheels, and the upper extremities of the two levers supporting the wheels pulled towards the attendant. The action lowers the ends of the levers to which the wheels are attached, or rather, tends to press the wheels against the ground; and the leverage thus obtained raises the implement out of contact with the ground. Behind the body of the implement, which acts in the soil, two wings are placed, which expand outwards, and spread the soil and manure over the land.

(2.) To their well-known liquid manure drill Messrs. Reeves, of Bratton, have adapted this season the "drop drill" invented by Mr. Chambers, the gentleman to whom the agricultural world is indebted for the "broadcast manure distributor." The simple mechanism of Mr. Chambers is confined entirely to the coulter part of the drill, so that it is capable of being applied to any form of water drill. There is little diversity of opinion as to the desirableness of a "good drop drill for root crops." The difficulty hitherto attendant upon all attempts to perfect a machine of this class has been caused by the employment of dry, dusty manures, by which the chances were lessened of the seed germinating, in dry seasons. By the use of liquid manure, deposited (along with the seed) at intervals, and not in a continuous stream, Mr. Chambers obviates the difficulties attendant upon the system as hitherto tried; and the following advantages are obtained: 1, A saving of two-thirds the quantities of water now applied, thereby making the drill applicable on light-land farms, where water is scarce; 2, A saving of half the quantity of seed; 3, A saving of manure, from its being deposited only where required; 4, Where land is clean, a saving of one hand-hoeing; 5, The certainty of having the best plant in the right place, and thereby obtaining a decided increase of produce. The mechanism by which these advantages are obtainable is remarkable for its simplicity of action, and the absence of all complicated parts liable to derangement. The following brief description may suffice to explain its peculiarities of arrangement: A hollow rotary chamber, provided with four arms or spouts, revolves on an axis supported on bearings fixed to a frame, attached to the drill, in place of the ordinary swing lever and coulter. The spouts project from the periphery of the hollow chamber; and through these the liquid manure and the seed are passed, to be deposited in the ground as each spout or outlet comes in contact with it. The liquid manure and seed are delivered to the interior of the chamber by means of a spout, which is also carried by the frame. The successive deposits of seed are made in a furrow, formed by a coulter, which precedes the wheel, and is adjusted in the usual manner. The hollow chamber receives its motion through the medium of a wheel running on the land, and which is keyed on the same shaft which supports the hollow chamber. The distance between the outlets of the spouts of the hollow chamber being invariably uniform, the intervals between the deposits of seed will be uniform also. To obviate this defect, however, and give an adjustability to the mechanism, so as to enable the distance between the seed deposits to be regulated as desired, the wheel which gives motion to the chamber is made in segments, each of which is attached to one of the spokes, or arms, provided with slots and bolts, and nuts, by which they can be adjusted nearer to or further from the centre, thus reducing or enlarging the periphery of the wheel. So effective is this simple mechanism which we have now described, that the wheel can be made to rotate even at a very high velocity, without in any way impairing the integrity of the alternate or intervallic dropping, each deposit having its proper modicum of seed and liquid manure, and being perfectly independent of the preceding and succeeding ones.

(3.) Messrs. Reeves also exhibit, in addition to the liquid-manure and drop drill just described, a simple hand-drop drill, which seems likely to be useful for market gardens and small occupations. The main feature of the apparatus may here be described. To the framing, which runs on two wheels, and is worked by a cross-handle, the seed-chamber is fixed; this being formed of a vertical cylinder, some three or four inches in diameter and six or eight in height. The lower part of this is capable of being placed very near to the ground while the machine is in operation, and this facilitates the "bunching" and depositing of the seed. In this seed-chamber a circular plate, or partition, of cast-iron is placed horizontally, provided with a ring or a series of apertures of determinate size. In close contact with this plate another, similarly perforated, is made to revolve by simple mechanism. While the solid parts of the upper and revolving plate, on which the seed placed in the chamber rests, are opposite the perforated parts of the partition or plate below it, there is no passage downwards for the seed; but as soon as the perforations of the two plates coincide with each other, a passage is made for the seed, which drops down through the lower part of the chamber, and is deposited in the ground at intervals corresponding to the number of holes in the plates and the rapidity with which the revolving plate is made to rotate. Various plates are used, according to the kind of seed which it is desired to deposit. A coulter is placed in advance of the seed-chamber, to form a furrow, in which the seed is deposited.

(4.) In addition to the machines already noticed, Messrs. Reeves exhibited a specimen of Mr. Palmer's rotary corn separator or screen, for which, we believe, the first prize was awarded at the York Show in August last. As this machine presents several features of considerable novelty, we propose to give a brief description of it. In general appearance it resembles the well-known barley hummeller of Messrs. Garrett, the main feature being a rotary cylindrical screen or sieve, the shaft of which is placed at an angle, and is turned by means of a winch or handle, or through the medium of a pulley, if steam-power is used. The meshes of the cylindrical screen are made of four different gauges, the coarsest of which is at the delivery, and the finest at the feeding end. Below these divisions of gauge, shoots or spouts are placed, to conduct the products of the various screenings to suitable receptacles. Thus the first spout receives from the finest gauge of the screen the small dust and seeds, the second spout from the next finest gauge the very thin corn, the third spout receives the tail corn, while the last receives the best. Poppy heads, and other bulky substances which will not pass through the largest meshes, are received into a fifth shoot. But the main feature of the machine consists in the adaptation of a series of segmental partitions or plates to the interior of the cylindrical screen; these fitting close to the inner periphery, and arranged at distances from each other of one-and-a-quarter inches, so as to extend from one end of the cylinder to the other. As these partitions revolve, they drag the grain up the side of the cylinder, but not over or round the shaft or centre. As the cylinder in its revolution carries round these partitions or segmental plates, they dip into the corn lying on the under side of the screen, and rubbing against it, tend to arrange the individual grains on a line with the meshes, and to facilitate their escape from the screen. The action of the plates is also to spread the corn over a large surface of the screen, giving a greater operating surface than is usually obtainable in ordinary revolving screens. The simple means here adopted has also, it is said, the effect of obviating the defect of ordinary winnowing machines, namely, the passing of "kernels" or "pickels" of the same specific gravity as the best corn, but which are smaller and thinner in size. Mr. Palmer informs us that his machine effectually overcomes this difficulty. To keep the meshes of the screen clear, a brush of steel wire is applied at one side and near the upper part of the cylinder. Messrs. Reeves make the wires of which the brush is composed curved; this increases their elasticity, and enables them better to thrust inwards any grain, seeds, or other substance which may get fixed between the wires of the screen, or be carried up to the level of the brushes.

(5.) In this class of machines we have to notice another novelty, namely, the "adjusting screen" of Mr. Roby, whose "corn screen" is well known to many of our readers. By a simple arrangement the distance between the wires of the screen can be adjusted so as to suit different sizes of grain. If the reader will imagine two tiers or series of wires placed parallel to

o o o o o o o
o o o o o o o

each other, the upper row or series of which is fixed, forming the permanent screen over which the grain passes, while the wires of the lower row or series are capable of being moved simultaneously from side to side, so as to occupy any position between the wires of the upper row, thus—

o o o o o o o
 o o o o o o o

he will have some notion of the method by which different gauges or width of spaces between the screening wires are made, so as to suit different sizes of grain. The necessary adjustment is very easily made.

(6.) We may here notice, as closely connected with this department of mechanism, the barley aveller, or hummeller, exhibited by Messrs. Barnard and Bishop, of Norwich, and invented by Mr. Holben. Our readers are doubtless aware of the "hand hummeller," consisting of a square frame of iron, open at top and bottom, and two of the sides of which are connected by a cross or curved bar carrying an upright handle. The space between the sides of the frame is filled up with cross divisions of the same depth as the sides of the frame, and so arranged as to form a series of square cells, open at top and bottom. The barley, to be got rid of awns, is placed on the floor of the barn; and the frame with its divisions worked by means of the handle gently up and down amongst it. The friction of the thin edges of the frame and its divisions on the grain, and of the particles of grain upon each other as they are forced up into the cells, gradually removes the awns. Mr. Holben takes this contrivance, and in place of working it by hand, gives it a reciprocatory motion up and down by means of a cranked shaft, to the end of which a fly-wheel is keyed on; and to the other a small pinion, which engages with a spur wheel, put in motion by an ordinary winch handle. To the frame-work supporting this mechanism a hopper, with regulating or feed-plate, is connected. The barley to be avelled is put into this, and is passed at the rate of from ten to twelve quarters per hour, in a thin stream or layer, below the reciprocatory frame with its square cells.

An adaptation of this apparatus to a winnowing machine was also exhibited. In this a series of elevators take the grain as it is passed from the winnowing-machine, and carry it up to the hopper, from which it is passed to the hummelling frame.

(7.) Mr. Simpson, engineer, of Petersham, Surrey, exhibited a new hay and straw band-making machine, which presents some features worthy of notice. The apparatus consists of an oblong frame, supported on four standards; in the centre of the frame a shaft, with fly-wheel and small pulley, revolves in bearings. From the small diameter pulley fixed on the shaft, power is taken, by means of a belt, to two other pulleys of same diameter, fixed on the shafts revolving in bearings near each end of the framing. To the outer extremities of each of the shafts the hook, to which the hay or straw to form the band required, is attached. Under ordinary circumstances the hooks do not revolve, although the shafts to which they are connected may be revolving; but as soon as the straw or hay is attached, and the "drag"—made by the operator as he walks outward from the machine—put on, the hook is pulled outwards till it engages with a catch on the driving shaft, and it immediately partakes of its motion; on the "drag" being stopped, the hook is pulled out of connection with the catch of the shaft by means of a spring. By this arrangement three separate lengths of bands may be made; and as each hook is in a quiescent state when no band is attached to it or dragged on it, should one operator be finished with his length before another, he can commence a new attachment to the hook without necessitating the stoppage of the other two, which would be the case if the hooks had no movements independent of the shafts to which they are attached.

(8.) In the department of machines for the preparation of food for stock, we have little novelty to describe. Mr. Bentall exhibited his patent root pulper. As this is a comparatively new machine, we may here shortly describe it. Its main feature is the employment of a central barrel or drum revolving in the lower part of the hopper which receives the roots on which the machine operates, in close contact with, and parallel to, a small worm or archimedean screw. The large barrel or drum is provided with a series of projecting teeth of a hooked or curved form; these are not arranged in parallel lines in the periphery of the drum, but are set spirally, forming a helical line, the pitch of which corresponds with that of the small archimedean screw noticed above. To one end of the shaft of the central barrel or drum the fly-wheel is keyed on, to the other a spur wheel engaging with a pinion fixed on the end of the archimedean screw shaft. As the screw revolves, the thread or blade passes continuously between the projecting teeth of the drum, and the combined action thus resulting, the tearing of the teeth and the lateral or side squeezing of the blade of the screw, rapidly reduce the roots subjected to it to a fine pulp. As the projecting teeth of the drum are not cast on it, but are wedged into slots or apertures provided in its periphery, should any break they can easily be replaced by new ones.

(9.) In the department of chaff-cutters, Messrs. Richmond and Chandler exhibited a new form, which is noticeable for its compactness of parts and neatness of appearance. In its mechanical arrangement it is similar to their well-known chaff-cutter, and is characterised by careful workmanship.

(10.) Mr. W. Snowden, of Longford, Gloucester, exhibited a chaff-cutting machine, which possesses considerable novelty of detail, and is worthy of attention from the ease with which a single attendant can work a large machine. The principal peculiarity is the absence of feed-rollers, and toothed gear. The hay and straw are only passed outwards when the knife is out of contact with them, so that no power is lost in the material pressing on the knife. The whole length of the box (seven feet) acts as the bottom feeder, and by a simple adjustment of a thumb-screw, different lengths can be cut, varying from ¼ of an inch to 1½ inches long. The bottom feeder consists of an endless cloth, revolving on back and front rollers. To the front roller a ratchet wheel is attached, to which motion is communicated by a lever and catch, that being moved by a pin placed in the front frame of the machine. This frame has a reciprocatory movement given to it through the medium of a crank, worked through the agency of the fly-wheel which carries the cutting knives. The front frame is provided with a cross bar, to the centre of which a stud is fixed; to this stud the end of a cross lever is jointed; this lever is carried backwards a short distance, and is jointed at its other extremity to a stud fixed in the centre of an iron block, which acts as the top feeder, and which moves up and down in grooves made in the sides of the framing of the machine. This iron block carries a revolving roller midway between the lever. Jointed at either end to the front frame with the iron block, another lever placed at right angles to it is fixed. This lever is nearer the front frame than to the block. Pivots are provided at each end of this cross lever, to which a board, called by the inventor the pressing-board, is attached; as this pressing board is not under the control of the crank, it presses on all thicknesses of material, from three to seven inches, passing out to the action of the cutting knife, and the iron block sliding in a groove accommodates itself also to all the thicknesses. When the iron block goes down the pressing-board rises up, so that the iron block acts alternately as feeder and presser. R. S. B.

THE ADVANTAGES OF LEASES.

On the 30th of December last this question was brought under discussion at the monthly meeting of the Winfrith Farmers' Club. The subject stood as "The Advantages of Leases; Security to the Tenant an Inducement for the Outlay of Capital."

Mr. Reader, after a few introductory remarks, said the subject for that evening's discussion was a most important one, as it affected the whole farming interest of England, who, he was informed, had, some years since, over £6,000,000 invested in lands, which amount was increasing year by year, as improvements took place. The question for their general consideration would be: "Were any advantages to be derived from leases? Were they inducements for the outlay of capital? Who would be benefited by leases? And would any parties be injured by them?" He trusted that they should prove by their discussion that they were not actuated by any selfish motives or hostility towards any party, but that their arguments were intended to improve the state of agriculture in general, which must necessarily improve the position of the landlord, the tenant, and labourer. He thought no one would deny that the most practical landholders of this kingdom long since saw the necessity of giving to the tenant a security for his outlay, as an inducement to invest his money with cheerfulness in every acknowledged improvement. For instance, the late Lord Leicester, the Earl of Yarborough, and the Duke of Bedford, he believed, adopted the system of leases, coupled with a tenant-right at the end of it; and he (the speaker) was also credibly informed that neither of the two first noble personages alluded to, ever had to pay one shilling for those very great improvements which had been acknowledged by all to have been made upon their estates; for they had always found their tenants ready and willing to pay for them themselves. Now, he would ask, where was the gentleman to be found who had improved his property to the same extent, at so small a cost, under the tenant-at-will system? The late Mr. Pusey likewise saw the necessity of a change, and brought his famous tenant-right bill before the House of Commons on various occasions; and although it was rejected on its first appearance by a large majority, it gradually gained favour, and was twice carried through the Commons, only to be rejected by the Lords. He believed, however, if that worthy man who introduced it had only lived a few years longer he would have seen it become the law of the land. Again, let them consider also what that eminent man, Judge Gale, said on this subject at the Botley Club two years since: "I need not enlarge," said he, "on the absolute necessity there is that the tenant should be protected by securing to him a lengthened time in the possession of that land which, on all sides, he is urged to improve by an investment of capital in it." Another paragraph said, "The objects to be sought for in a lease are security to the landlord and a freedom of action to the tenant. The landlord desires to have security that the land shall not be improperly cultivated, and the tenant that he shall not be restricted in making the improvements which his *soi-disant* friends are so liberally urging him to make." Then he had the authority also of a practical man (Mr. Stares, of Droxford) for saying that numerous existing leases prescribed a course of cultivation which was simply absurd. By a tacit consent these were commonly disregarded; and the consequence was that the tenant would be better off without a lease at all, as such a lease puts him, at all times, at the mercy of the landlord, and, indeed, was of no use but to put a fee into an attorney's pocket, for copying a senseless document, originally prepared in the dark ages of agriculture. He (Mr. Reader) had brought forward these remarks in order to prove that the practical landholders had been prepared for a change in the tenure of land for a long time past, having no doubt themselves seen the difference in the improved culture of the land which had been secured to the tenant for a lengthened period over that held from year to year—except occasionally, where a fair and equitable tenant-right had existed. If such gentlemen as the noble lords he had before alluded to could see the necessity of giving security to the tenant for his outlay of capital as an inducement to invest more capital, and to improve their land in every respect, when the general system of farming, more especially in the west, was—

To plough and to sow,
To dress in and mow;
Then harvest and thrash,
And market for cash,

was not that necessity increased five hundred times over, when thousands of pounds were annually expended in this county alone upon artificial manures, and thousands more in feeding stuffs, a large portion of which could not be returned for years? He believed there were farmers in this country who paid more every year for those manures and feeding stuff than ever their rents amounted to—to say nothing of the extra amount of labour this must necessarily entail. They had had bones in use as a manure only a few years, comparatively speaking, and, if he remembered rightly, guano was first imported into this country about the year 1836, by Gibbs and Co., which sold at about £6 per ton. Since that time, however, a better quality had been found, and now, he believed, the importation amounted to upwards of 240,000 tons. Then there was superphosphate, the general manure for the root crop, the quantity used being beyond description. He was credibly informed that over £25,000 a year was spent in the county of Dorset alone upon artificial manures. He found that although linseed cake had been used extensively in some of the upper counties, where security was given for the outlay, for some years past, it had only been introduced here about ten years since, by Mr. Virtue, the agent of Dixon and Cardus, and its sale, though small at first, had gradually increased year by year. Then, again, there were so many other sorts of feeding stuffs sold in the market, such as Indian corn, lentils, &c., &c. Now, if they took it that Messrs. Dixon and Cardus, by their agent, sold 1,000 tons of linseed cake, and estimated that sold by other firms at 1,000 tons more, at about £11 7s. 6d. per ton, they would have an amount equal to that spent in manures besides all the other feeding stuffs named. He (the speaker) would ask them whether this quantity might not be doubled, nay trebled, and made to pay a good interest, provided tenants could be insured in their holdings? They often saw where money might be laid out advantageously, if parties were only sure of keeping their farms for a certain number of years; he believed, moreover, that if leases were generally adopted, they would see machinery increase to a very great extent. If a man were secure in his holding, he would doubtless adopt every modern principle of improvement, both in culture and implements; in fact, he would expend on the farm every pound at his command, provided he could see any chance of getting something like a return for his outlay, even though it were ever so far distant. He would endeavour to improve his farm in every possible way; he would likewise see the necessity of turning his attention to the improvement of the labourer, knowing full well that if attention were paid to his comforts, for every little sum of money he might lay out he would be sure to be amply repaid. If they were to have machinery introduced among them, as in Scotland, they would find that they must have an improved class of men for the management of it. Now, he would ask why was it that the Lothians of Scotland were held up as an example to follow, and how came those parts to be so well cultivated? Why, the fact was this—the tenants had security for their capital, either by way of lease or tenant-right. Mr. Reader then referred to a communication which he had received from a friend in Scotland, regarding the holdings of tenants. The writer, after drawing attention to a town on the borders of Selkirk and Roxburghshire, near which a small stream empties itself into the river Tweed, says: "The country to the north of this is mountainous, and presents a very rugged and barren appearance, and is in many places so steep as to render cultivation impossible and most difficult. Its rocks contain no fossil of any description, and are very hard; covering them, however, to various depths, is a deposit of clay, of various degrees of tenacity. In some places, where the underlying rocks are more brittle than in others, the soil works easily; in others it is very difficult to reduce it to good tilth. It nearly all requires to be drained; and when this is performed, and lime applied at the rate of about four or five tons per acre, it will grow very good crops of roots, grass, and corn. Not a great many years since the only cultivation on the borders of the stream already mentioned was a mere strip of oats, and occasionally a little barley. Now large fields are brought into cultivation on the steep sides of the mountains; and where a few years ago only stunted heather, bad grass, and a little furze formed the only productions, are now grown excellent crops of corn and roots. One can frequently see two men sowing together, one of whom sows oats, the other guano, despite its price. On most of these farms there is a steam-engine fixed, which is the property of the tenant; and by the goodly rows of feeding sheds, it is at once evident that great attention is paid to beef-making. The greater proportion of the draining of late years is done by Government money, for which the tenant pays 6½ per cent.; but a large breadth is drained by the tenant, at his own expense, excepting the tiles. Without one exception, the whole of these farms are held on leases of considerable length—generally for 21 years—and the majority of the occupiers do not expect to derive any profit until after the lease is half expired. Most of them make a good return for the money laid out, and nearly all contribute greatly to the general improvement of the district. Fixed for so long a period in one place, a complete identification with local and parochial affairs, and a permanent interest in the labouring class, are fully secured; while all the time the tenant feels quite at home, and perfectly independent, quietly pursuing his course, and year by year adding section after section of the rugged steep to the cultivated portion of his farm. He feels he has confidence in himself, his soil, and the means employed; he regards his landlord with feelings of respect. It is impossible that such land could have been cultivated by tenant farmers without leases; nor without them would men of capital and skill have been attracted to so unpromising a district. Much as the Lothians have been talked about, and high as is the position to which they have risen in the agricultural world, there is nothing there which speaks so forcibly, or which proclaims so unmistakeably, the advantages of long leases, as the higher districts present; and where we find cultivated farms, of 300 or 400 acres in extent, where twenty or thirty years ago not more than one-third was under the plough, and that the breaking up still continues—where we find the face of the country so changed—where we find everything altered, save one, namely, the relation of landlord and tenant, and that secured by a tough bond of 21 years' length—where we find time only deepens the impression that such long terms tend to the benefit of all concerned—there need be little hesitation in recommending a similar bond to the notice of all parties, and more especially to those who are compelled to farm under the unsatisfactory tenure of one year. Many instances could be named wherein the land which produced, only a few years since, poor grass, heath, and broom, and which was not worth 1s. 6d. per acre, is now considered cheap at 15s. per acre. I have just heard of an instance where, on a farm of 1,000 acres of arable land, the tenant has expended, one way and another, over £15,000, and hopes he will be repaid with good interest before his lease expires. Of the indirect benefits of such a system it is needless to say a word, as they are patent to all." Mr Reader then proceeded to say that he thought this communication from Scotland quite sufficient to prove the desirability of long leases. They had often heard of Scotland, of Norfolk, of Nottingham, &c., as being well farmed, and examples worthy of following, but they did not tell them the cause of this good farming. They did not tell them that security was given to the tenant, either by way of lease or tenant-right. The system of making tenant-right at Nottingham was this: For bones, one-sixth after a crop of turnips, the whole cost and carriage; after one crop of corn deduct two-sixths; after one crop of corn and grass mown, one-half; after one crop of corn and two of grass, four-sixths; and after two crops of corn and one year's grass, three-fourths. For lime allow for two crops the whole value and labour before a crop, and half labour after one crop. For all artificial manures, such as guano, rape-dust, superphosphate of lime, &c., one-third, without carriage, after one crop of corn or grass mown. For linseed cake one-fourth of the bill for the last two years, and in many cases one-fourth and one-sixteenth. This was a tenant-right, which certainly would hold out some inducement to invest money, but not to half the extent as a good long lease. He would ask them to look around, and see where was the tenant, holding his farm from year to year, and liable to be turned out at six months' notice, that could compete with his friend, the vice-chairman. (Hear, hear). He (Mr. Reader) would ask him personally whether his farm would have been so attractive as it was at the present time, had he not been holding under a lease? It might be all very well for people to talk of the confidence they had in this and that gentleman; but this he did object to, as it was not based on a sound and commercial principle; and, how had they seen that confidence abused within the last few years? He took, as an instance, the Duke of Northumberland. Not many years since his tenants thought they were safe; but the Duke offered a few prises for good cultivation, &c., and, after getting his farms improved by his tenants, he, or his agent, with his sanction, drew up a lease, which the tenants were to sign or quit. He (Mr. Reader) thought it was admitted by all parties, who had the least knowledge of farming, that it was quite impossible for any person to follow the rules laid down, and the consequence was some of his best tenants left. He believe he was right in saying that one of the clauses gave the landlord or his steward the right to take possession of the land and all stock, &c., on the farm, to sell, and such like, and to deduct the rent, and what he thought proper besides, for any little deviation from the rules prescribed in the lease, and then hand over the remainder to the tenant. Mr. Reader then cited the case of another noble earl who offered prizes in a similar way, and where a tenant had spent in improving his farm, in about five years, no less than £3,000, and who then received six months' notice to quit, and to leave behind him all the hard earnings of his life for the benefit of the landlord. This tenant, he believed he was right in saying, had on the farm, at the time of receiving notice to quit, some 700 tons of night-soil, collected from the different towns, and 300 tons of lime. Nor was this the only case where a tenant had been ejected from his holding under similar circumstances. There was a certain captain (his name we withhold) who received six months' notice to quit, after having improved the farm to a very great extent; but there was this difference in the two cases—that the latter laid no blame to his landlord, but on the steward, and would not condescend to ask the reason why he was to be ejected; whilst the former inquired the cause, but obtained no reply. Now they had no means of knowing why either of these tenants, who had proved themselves good farmers, and had added wealth to the county, but who were now obliged to leave all behind them, should be thus served. It might have been some little petty affair. It might have been something respecting those vermin, commonly known by the name of rabbits. And were not most of them subject to such annoyances, and often without the means of knowing what was reported to landlords by gamekeepers against tenants? He (the speaker) thought if there was one reason more than another which ought to urge tenants on to the necessity of having leases, it was the rabbit system generally adopted by landlords. (Hear, hear). He should certainly like to see what it costs the county in keeping up those feudal game-laws. Before he concluded, Mr. Reader begged to draw their attention to another point, and that was to the impoverished state of the pasture land in this county. What, he would ask, was the cause of it? It was simply this—it required a longer time to get a return on grass land than on arable; and this he believed to be the only cause why the grass land had not attracted the attention of the tenants generally. He would also ask them this question: Supposing they were to manure a piece of meadow land just after the hay-harvest (generally admitted to be the best time), and at Michaelmas receive six months' notice to quit, what benefit would they derive from the manure? None. This circumstance alone he thought quite sufficient to call on landlords to grant leases for the benefit of themselves, the tenants, and, above all, the labourer (applause).

Mr. **Randall** perfectly agreed with Mr. Reader in his observations as to the advantage of leases. Although they were quite satisfied that a great many tenants-at-will had gone on for a number of years, and that there had been a good feeling existing between them and their landlords, still he did not think there was any real security to a tenant, unless he were holding under a lease. It often happened that a tenant-at-will entered upon a farm, which might be in a very bad state of cultivation; he might lay out his capital in improvements, subject to quitting at six months' notice; after expending much of his capital, there might be such a thing as the farm falling into other hands—there might be fresh stewards, and such like; therefore, unless there were security of some sort, he did not think any man justified in laying out his capital upon it.

Mr. **Saunders** (the Vice-President) said, as allusion had been made to him by Mr. Reader, he begged to make one or two observations. He had told them that he (Mr. Saunders) had improved his land because he was holding it under a lease, otherwise he could never have brought his farm to the state of cultivation he had; but he must inform them this had not been done but at a very great expense. He did not approve of what was termed the "cut-and-go" system, where a man had a return for his money each succeeding year—they ought to work for their landlords as well as themselves. He had been spending a very considerable sum in manures, &c., during the last thirty years; therefore he thought that a man holding under a long lease was of public good, because he was employing a great deal of labour in the neighbourhood in which he resided, and he was also expending a considerable sum in manures, &c.; therefore he was, in fact, a national good. He (Mr. S.) considered the tenant-at-will system a very bad one, because a man must make his rent during the year he holds it, not knowing whether some one else might not soon have possession of it. No tenant of a yearly holding was justified in putting himself to a great expense, because his present landlord might die, and he knew not who might then have it. In those cases it sometimes happened that the landlord might say, when the farm was looking well, "I do not want to lose you, but then I must have more money;" and perhaps, by having a notice to quit, this brought him and his family into difficulties. If ever they passed by a farm (generally speaking) that was badly cultivated, and made the inquiry of the tenant, "How is it you do not farm better?" the reply was, "I am only a yearly tenant, and I must do the best I can." Many had told them that the reason they could not do better arose from the circumstance of their being only yearly tenants. Although they advocated a lease upon a farm, very much depended upon the conditions of that lease whether a man could put that farm into a good state or not. He (the speaker) called a seven years' lease no lease at all, in fact he would rather be a yearly tenant in such a case; but if a tenant had a fourteen years' lease he could go to work, for his hands were not then so much tied. He did not think, however, that a landlord was justified in letting for a long lease to a man who takes a farm and puts nothing on it, such an one was not entitled to a lease. There ought to be an understanding between landlord and tenant that the lease should be an open one until within the last one or two years of its expiration, so that there might be sufficient time allowed the latter for recovering himself. He did not like the idea of being compelled to adhere to certain rules, that wheat must be sown one year, and turnips another, and so on; for his own part he was holding under an agreement to sow how he liked until within the last two years of the expiration of the lease. Mr. Saunders then repeated his argument, that if they saw a farm badly managed, it generally turned out to be a yearly tenure. He then cited a case where a man had a farm in Hampshire, which was much stocked with rabbits and hares. The tenant gave notice that he should give it up at the expiration of his lease. The farm was offered to others, but no one appeared willing to take it, on account of its being so infested with rabbits, &c., and the consequence was the landlord was obliged to take it into his own hands. At length, however, some one came along and offered to take it, provided these vermin were only got rid of; and the landlord having consented, a great number of rabbits were destroyed. He (Mr. S.) would advise everyone to have the damage done by the rabbits taken into consideration in their agreement. If the landlord paid for it, it would be all very well. He should be sorry, however, to place any restriction upon the landlord, and he hoped that he should always be able to see his own have a good day's sport. As for rabbits, he called them no sport: they were nothing but vermin. In conclusion, he observed that if a man did not manage his farm well during the first lease, a second ought not to be granted him. No doubt there were a great many good landlords in this county to yearly tenants, but he thought a tenant of that description was not justified in farming "up to the mark," as if he held under a lease. If a man had a lease for 12 or 14 years the landlord ought to do many things towards improving the farm, and the tenant should be expected to do a great many more. He again urged the necessity of long leases.

After a few observations from Mr. Clarke, Mr. Reader, and others,

Mr. **Jackson** said it so happened that he had rented one farm as a yearly tenant, and one he had held under a lease. The first he took was as a yearly tenant, and the farm was very much out of condition, for it had been very badly managed. However, he set to work to improve it; and after some few years he had the satisfaction of seeing it produce good crops; but he soon after had the misfortune of feeling the ill effects of the system alluded to by Mr. Reader. He found that although he was trying to produce good crops, he had those vermin (rabbits) come and eat them up. It was true, he had one of the best landlords he could possibly wish, but he had the misfortune of having some one to go between and make mischief; circumstances being misrepresented as regarded the damage done by the rabbits. Mr. Jackson then went on to say that he obtained leave to kill what rabbits and hares he thought proper, and an improvement soon took place. At length, however, he desired to leave the farm, but did not like leaving behind what he had put upon it. He therefore asked permission to choose a tenant to take the same off his hands; but the consequence was the rent was to be raised, on account of the improvements which had been made. The result of this was that he could not demand so much of the in-coming tenant as he should wish. He then thought he was entitled to receive some compensation from the landlord for his outlay, and he kindly handed him a cheque on that account. If they could secure such landlords as that, they would not require long leases; but if he had died, what would have become of his farm? for here he had buried, as it were, his property in the soil. When he took the next farm he began to be a little wiser, and had it upon a lease. He took it upon the following terms—either for seven or fourteen years, to be at his option to leave at the end of seven if he felt inclined. After some further remarks, the speaker proceeded to say that he was very glad to find Mr. Reader had brought forward something on the rabbit system. He thought the farmers of England were very remiss in not coming forward in a body against it—he did not mean against the landlords. He had the honour of introducing the subject at an agricultural meeting some little time since, Sir E. B. Lytton occupying the chair; and he was gratified to hear the tables ring, and the hands clap, when he spoke against the game laws. If, however, Mr. A. was running with the stream, and Mr. B. was rowing against it, one had better be out of the way altogether (Hear, and laughter). He did not say this for the purpose of setting the landlord and tenant at variance, for he wished them to go on hand in hand; but depend upon it as long as the gamekeeper stood between them, they would never get on (loud applause.)

After a few observations from Mr. Reader, and others,

The Chairman having expressed himself in favour of the long lease system, offered a few remarks on the rabbit system, remarking that it was a subject between landlord and tenant; the matter ought to be laid before the landlord, who must be told that the rabbits are a nuisance. It was quite impossible to farm well when they had a lot of these about them. He then proposed a vote of thanks to Mr. Reader, for the able manner in which he had brought forward his subject.

Mr. Fowler said there was one part of the subject he should like to notice, and that was with regard to the vast amount of waste land in certain parts which might be brought into a state of cultivation. It had occurred to him that if they had the advantage of a long lease, trouble might be taken to make it productive. Let them look at the heath-lands, for instance; but if they had not length of time given them, it was impossible to do anything with it. With regard to the inexhaustible improvements upon their farms, he did think that it would be of great advantage, both to the landlord and tenant, if compensation were allowed. He concluded by seconding the proposition of Mr. Damen.

Mr. Reader, in returning thanks, referred to what had fallen from Mr. Fowler respecting the cultivation of waste lands, and observed that if, as he had shown them, such a thing could be done in Scotland under long leases, surely it might be done in this country—for what would apply to Scotland, would in some degree apply to England. He thought there was a great deal of waste land in this country that could be made to produce good crops, provided the system of long leases was adopted. He hoped he should live to see a different system in the holdings of land in this country than at the present time. He then moved the following resolution: "That this club would strongly recommend to the notice of the landholders and tenants the necessity there exists for improving the cultivation of the land, so as to develope its resources to its full extent, which cannot be carried out under the present tenure, more especially grass land. They would recommend leases of 21 years, determinable at the end of 14 years, by either party giving two years' notice; and at the expiration of the term a fair and equitable sum to be paid for unexhausted improvements."

The resolution having been carried unanimously, the proceedings terminated.

HADDINGTON AGRICULTURAL CLUB.

The monthly meeting of this Club was held in the George Inn, Haddington, on Friday, Jan. 8, Mr. Samuel Sheriff, Saltcoats, in the chair. There was a large attendance of members; and, after dinner and the usual loyal toasts, the subject before the meeting was, "Reports by Members of Experiments with Artificial Manures."

The Chairman said: Gentlemen, we are met this afternoon to hear "Reports of Experiments with Artificial Manures, by Members of this Club." You will recollect how, last spring, we came to discuss what were the "Best Substitutes for Guano." The continued rise in the price of guano compelled us to do this. The results of a few experiments made for this object I have now the pleasure to lay before you. But, gentlemen, will you bear with me while I introduce the subject by a few observations upon the marked change which has taken place within the last few years, both in the desire by agriculturists to give all the information in their power, also in the means of their doing so? Is it nöt a startling fact, gentlemen, when we think of it now, but a few years ago and we had no agricultural newspaper? All agricultural information was conveyed, and but sparingly, through the medium of the "Agricultural Journal of the Highland Society." Now, through the *N. B. Agriculturist*, we have a weekly record of the agricultural practice of Great Britain. What stimulus this gives to practical husbandry! One great feature of the age we live in is the desire for information; and this again is met by as great a desire to impart it. Some years ago, I remember (shortly after this Club was formed), we had a serious discussion whether our discussions and reports were to be given to the public. Were such a motion to be made now, what would become of it? It is by this system, and this system alone, that the proper cultivation of the soil is to be continued and increased, in order to keep pace with the rapid strides of advance made in every other science. Some very cautious men would argue, it does not do to tell too much. An invention in machinery is patented, and an immediate reward accrues to the inventor. Can you grow 14 bolls of wheat or 40 tons of turnips per acre, by following some system known only to yourself? Do so, and keep your secret. I would compare the man who would do so "to the servant who hid his talent in the earth." Cultivators of the soil have a heavy responsibility; besides having their own interests to look after, what countless thousands depend on them for the *substantial* necessaries of life! The more you can make the soil produce the better for the grower, and the greater the supply the better for the consumer. The only antidote to low-priced grain is to grow more of it, if possible; or by making an acre of turnips feed two cattle instead of one, you can afford to take a cheaper price per stone. Some years ago, when grain was considerably cheaper than at present, this doctrine was both preached and practised successfully. But the means at command were very different. We could procure the finest Peruvian guano at £9 per ton, nitrate of soda at £15, rapedust about £4 10s. Contrast the present prices of these articles. Why, in guano alone, the farmer using 30 tons, finds an extra charge of £180. Why are these things so? We have it in our power to resist extortion, simply by refusing for a time to use the article. Why have we frequently to take much less of a Friday for our grain? Just because the buyers refuse to give more. Look at the heavy fall which has taken place of late in the price of almost every marketable commodity—skins and hides especially. All this falls upon the farmer; and are they going to be so inconsiderate as to give the present high demand for guano? But this brings me to the subject now at issue. Before laying the results of the experiments before you, let me ask why you try experiments? Of course, you anticipate the answer, viz., for a two-fold reason—first, to ascertain what is really the most profitable stimulant to apply to vegetation; and secondly, to detect the weaknesses of the many fertilisers now offered to farmers. There is not a season without something new, and the best ever heard of has not been offered to us. We are asked by some one or other to try his patent improved quintessence of something or other; you are prevailed upon to try it, and find yourself minus £8 9s. without any benefit—sometimes a loss, because some safer and known stimulant would have secured a good crop.

TABLE No. 1.

EXPERIMENTS WITH SWEDISH TURNIPS.

Farmyard manure applied on the stubble, 30 loads to the acre Scots. Artificial manures applied in the drill at the rate of 5 cwt. per acre.

	Cost per acre.			*Yield.* tons.	cwt.
No. 1. Mixture 2½ cwt. guano and 2½ cwt. B. manure, at 11s. 6d.	£2	17	6	22	14
No. 2. 5 cwt. Dall's manure, at 9s. ..	2	5	0	19	10
No. 3. 5 cwt. Peruvian guano, at 14s. 6d...........................	3	12	6	23	6
No. 4. 5 cwt. B. manure, at 8s. 6d...	2	2	6	21	5
No. 5. same application as No. 1, but different seed, at 11s. 6d.........	2	17	6	15	13

Comparative Results of the above.

Guano, No. 3, gives 12 cwt. of swedes more than No. 1, but at a cost of 15s.

No. 3 gives 2 tons 1 cwt. more than No. 4, but at a cost of £1 10s.

No. 3 gives 3 tons 16 cwt. more than No. 2, at a cost of £1 7s. 6d.

No. 5, Different seed, 7 tons 13 cwt.

TABLE No. 2.

EXPERIMENTS WITH WHITE GLOBE.

No manure to stubble.

				tons.	cwt.
No. 1. 8 cwt. per acre superphosphate, at 8s.	£3	4	0	9	0
No. 2. 8 cwt. guano, Peruvian, at 12s. 6d.	5	0	0	12	12
No. 3. 8 cwt. B. manure, at 8s. 6d...	3	8	0	10	4
No. 4. 8 cwt. Indian guano, at 8s....	8	4	0	10	16
No. 5. Mixture, 5 cwt. bones and 3 cwt. guano, at 10s. 6d.	4	4	0	12	0

Comparative Results of the above.

No. 2, Guano, gives 3 tons 12 cwt. more than No. 1, at a cost of £1 16s.

No. 2, Guano, gives 2 tons 8 cwt. more than No. 3, at a cost of £1 12s.

No. 2, Guano, gives 1 ton 16 cwt. more than No. 4, at a cost of £1 16s.

No. 2, Guano, gives 12 cwt. per acre more than No. 5, at a cost of 16s.

TABLE No. 3.

EXPERIMENTS WITH PURPLE TOP.

				tons.	cwt.
No. 1. Mixture, 10 cwt. drill bones and 5 cwt. rape, at 6s. 3d. per cwt.	£4	13	9	14	8
No. 2. Mixture, 3 cwt. guano, Peruvian, and 5 cwt. superphosphate, at 10s. 6d. per cwt................	4	4	0	16	4

Comparative Results.

No. 2, gives 1 ton 16 cwt. more than No. 1, costing 9s. 9d. less.

Well, gentlemen, the results of the experiments which I now lay before you, go to prove that guano is the greatest fertilizer we possess; but when you come to count the *cost*, it is not the most profitable at its present price—at least, from an analysis of my experiments. You will observe that the extra quantity of turnips raised from guano cost the owner too much. The striking feature in the experiment No. 5 of Table 1, shows how important it is to secure the best variety of seed. Why, here is an actual difference of 7 tons 13 cwt. where the same manures were applied. But this is a subject for another discussion. I would detain you too long were I to enlarge on this theme. I now refer you to Table No. 2. The small crop will startle you all. This I attribute entirely to accident. The first braird was completely burnt up by the hot sun we had for some days during the latter part of June and beginning of July. I had to re-sow the field, with the exception of a small portion, where I had the experiment between rape and drill bones against guano and superphosphate. They suffered also from the hot sun. The soil is almost pure sand. Gentlemen, I hesitated whether or not to tell of this small crop. Are we not too proud often to speak of our large crops, and keep the small ones to ourselves? I would call your attention particularly to the fact of this new guano; Indian guano, at £8 per ton, having grown a larger crop than superphosphate. I would refer you to an experiment made in Roxburghshire, where, when mixed with Peruvian, it gives a greater return than Peruvian alone. This is a fact well worthy of notice. I was rather surprised with the result of the experiments with purple-top turnips. The mixture of guano and dissolved bones brairded sooner, and were ready for singling some days before the other; but during autumn the contrast was most marked—the leaves of the rape and drill bones' experiment continued green long after the other had withered: but the earlier turnips this season were by far the best crop, and in eight seasons out of ten we will find this to be the case. But I fear I trespass too long, when I consider the other reports to be brought before you, while, I cannot close without expressing a hope that we may really, and in earnest, try to resist the high price asked for *guano*. This is a season of great commercial depression. It is felt by all. May the cloud which now hangs over us soon disappear. I am sure all who deal in the artificial manures most in vogue must know that the greater the quantity sold, even at a small profit, is best for themselves. I would close my observations with one remark on the difficulty of arriving at correct conclusions, unless experiments are repeated. This county stands pre-eminent for its agriculture. Let it not be behind others in its endeavours to impart additional information. I may mention that the measurements, weighing, &c., of my experiments were conducted under the eye of Mr. Patrick Sheriff, whose qualifications for this are known to you all.

Mr. HOPE, Fenton Barns, said: He had listened with much interest to the excellent paper which the Chairman had just read. The experiments appeared to have been carefully conducted, and the results accurately ascertained. There was, however, something very singular attending the turnip crop this year. Some fields were remarkably fine, and others very inferior. A difference in a single day in the sowing made a difference of tons per acre in the crop, while an over-luxuriance in leaves in many cases diminished the size of the bulbs. Guano had not this year with him maintained its wonted superiority; perhaps they had been applying it too liberally for some time past, and manures richer in phosphates might be found more profitable. He had tried Cant's manure, which had been supplied to him by Mr. Peacock, of Edinburgh, in growing swedes. The land was well manured with farm-yard dung on the stubble in autumn. He gave 7½ cwt. of Cant's manure, and 8 bushels bone-dust in the drills. Adjoining, he gave 5 cwts. Peruvian guano and 8 bushels bone-dust, all per Scotch acre. The guano had much the strongest leaves throughout the season, and, when he went to weigh the crop, he thought the difference in favour of the guano would be 2 or 3 tons per acre; but it turned out only 12 cwt. and some lbs. He had also sown a ton of manure which he got from Mr. Dall, North Berwick. He applied 8 cwt. per Scotch acre, along with about 20 carts dung in the drills, as against 5 cwt. guano and 8 bushels bones. The crop was purple-top yellow, and Mr. Dall's manure produced the heaviest crop by 10 cwt., though neither was so heavy as he expected. From these results, and the high price of guano, he was resolved to use less guano and more of bones and other manures containing a greater proportion of phosphates.

Mr. David Sheriff, Muirton, gave the following report of the experiments made by him at Muirton for crop 1857:—

EXPERIMENTS MADE UPON MUIRTON FARM—CROP 1857.

This season I made a trial of six different lots of white turnips, of three drills each, sown about the 15th of May, 1857; manured at the expense of £5 12s. per Scotch acre. The result was as follows:—

	tons.	cwts.
Guano	34	16
Dissolved bones	26	9
B. manure	29	0
Rape dust	30	9
Blood manure	29	0
Manning's patent	29	0

I made another trial also this season, with guano against Manning's patent manure. The land was dunged in winter at the rate of 28 carts of home dung per Scotch acre, and at sowing 210lbs. of guano against 5 cwt. of Manning's patent manure. The turnips were sown on the 4th of June, 1857, and weighed on the 11th of December last. The result was as follows:—

	tons.	cwt.	st.	lb.
Guano and manure—				
Green top white	27	18	0	0
Purple top	21	11	1	2
Manning and manure—				
Green top	27	0	6	12
Purple top	19	1	3	6

Money value of each of the manures, £1 6s. 8d.

Mr. Robert Scot Skirving, Campton; Mr. Durie, Standingstane; Mr. Cunningham, guano merchant, Edinburgh, and other members, took part in the discussion; and a committee, consisting of Mr. George Hope, Mr. Sydserff, Ruchlaw; Mr Robert Scott Skirving, Mr. Samuel Sheriff, and Mr. David Sheriff, was appointed to frame rules for members conducting experiments in raising turnips with the different manures—the results to be reported to the meeting of the Club in January, 1859.—*North British Agriculturist.*

MANURE WITHIN REACH OF THE FARMER.

SIR,—"Let nothing be lost," was the command of our divine Lord and Master to his disciples many centuries ago; and although, since these ages have elapsed, laws have altered and customs changed, the force of the axiom still remains unimpaired, and whether with reference to the warnings we may receive, the opportunities afforded us, or the advantages placed within our reach, it forms the basis of all success and prosperity in every undertaking: "Let *nothing* be lost." In applying this maxim to the collecting of manure, it might not be out of place to bear in mind the Scotch adage, "A stone is the only mote in a muck-heap"; but a more extended knowledge of things has taught us that what have long been considered stones are even to be made valuable as a manure. Almost every thing, therefore, is worthy of our attention in this respect, and is in some way or other to be rendered available in aiding fertilization.

In days when agriculture was much more imperfectly understood than at present, great carelessness was exhibited with regard to manure. Much valuable material was burnt, liquid manure allowed to run waste, and even the excrements of the stock with the straw lay exposed to evaporation, under a burning sun, and to waste by fermentation. I would be glad if in our day, and under the authority of an enlightened state of agriculture, no such abuses existed. But alas! I am sorry to be forced to acknowledge that men with their eyes open should still be equally neglectful of these important elements of successful agriculture, annually spending large sums upon artificial manures (many of which are altogether useless), and neglecting to take advantage of those valuable fertilizers produced upon their own farms, which require only care, attention, and a small outlay, to be rendered available.

The soil is to be considered as the great store-house, to contain the food of plants, and the medium operated upon by air, water, and heat, which, by their various actions upon the soil and the manure which it contains, transforms certain of their constituents into such a soluble and gaseous state as to be absorbed by the spongioles of the roots, and enter into the organization of the plant; so that it is by the application of the proper manures to the proper crop, and in such quantities as to meet the requirements of the soil, that the result in the crop, in ordinary cases, is to be attributed to the different descriptions of soil affecting this more particularly by their tendency to retain moisture or the contrary, their liability to become over-saturated, their power of attracting heat, or their readiness to become impregnated with those gases assimilated by the plants; so that the value of soils is not entirely dependent upon the amount of the food of plants which they naturally contain, but by the manner in which they (according to their nature) allow the food supplied in the manure to be assimilated by the plants, and yield to them the greatest benefit of which it is capable.

Having thus briefly adverted to the action of manure in the soil and its assimilation by plants, with the view of illustrating how necessary it is for every farmer to bestow the greatest attention upon the care and management of his manures, let me now turn more particularly to the object of my letter; and first reflect upon that custom so prevalent in all parts of the country of burning couch-grass and all vegetable rubbish collected upon the farm, a practice which I consider most wasteful and impolitic. By analysis we learn that throughout the vegetable kingdom there exists a great similarity in the constitution of plants, their components being almost the same, but existing in different proportions in different kinds of plants; surely, then, it is reasonable to conclude that there must be contained in all vegetable matter much that is valuable as the food of plants, and requiring only to be brought into such a condition as to be assimilated by them. No doubt combustion is a sure means of destroying the vitality of all seeds and weeds of every description; but it is an equally certain mode of dissipating mucilaginous, gelatinous, saccharine, oily, and extractive fluids, which along with solution of carbonic acid and water are substances, which in their unchanged state contain almost all the principles necessary for the life of plants. The substances, therefore, which principally compose vegetable matter are dissipated by the action of fire; and thus, by the loss of those very ingredients which constitute their chief value as a manure, they become reduced to a mere fraction of their original bulk.

Upon retentive soils, burnt earth or calcined clay may have a very good effect; but in this case their action (particularly the latter) is almost entirely mechanical, by disintegrating the soil—their value as a manure consisting chiefly in the amount of carbon, and its power of absorbing ammonia from the atmosphere. Paring and burning, although perhaps judicious in reclaiming certain lands in which all kinds of troublesome seeds, roots, grubs, and larvæ of insects abound, still in very many instances in which it is adopted it must be pronounced a wasteful practice; but whilst benefit may result from the application of fire in the instances above-mentioned, we know of no pretext whatever, beyond that of custom, for the burning of couch-grass and other vegetable refuse. Experiments have proved that the ashes of burnt straw are an excellent manure, but who would think of consuming his straw by fire! And yet as regards manure, this would be more excusable than the combustion of vegetable matter, inasmuch as the constituents of straw have become more solidified, and require more powerful means to effect decomposition than succulent vegetable matter, and also far less valuable, much of its quality being lost in ripening the grain. In ploughing in succulent vegetables for manure, of course decomposition immediately takes place without any preparation, and, with almost every description, a very slight incipient fermentation is only necessary to commence decay of the woody fibre; in fact, to allow any manure to ferment to a great degree is highly prejudicial to the interests of the farmer. Sir H. Davy even doubts whether *straw* would not be more beneficial as a manure if chopped up and applied in a dry state, rather than lose much of its value by fermentation; but we are now too well acquainted with the value of straw as an absorbent, &c., to be enabled to apply it in such a manner. To destroy the vitality of couch-grass or such-like weeds, the application of quick-lime, salt, or vitriol with a degree of fermentation is necessary. But where fermentation is going on in a dunghill, it is of great advantage to cover it with burnt earth to absorb the disengaged gases; or, if burnt earth cannot be had, then common salt with gypsum will have a good effect.

And now, sir, will you allow me to say a word to brother farmers upon liquid manure: I mean that produced in the farm-yard. Much has already been said and written upon the subject. I will not, therefore, be tedious, nor stop to notice all the different plans that have been tried and recommended for its use. Still, I see numerous instances of its being neglected. Why should this be? It is the very essence of your manure. Try to prevent its being over-diluted with water by troughing your buildings, &c., although a *little* water mixed with it is advantageous when applied in a liquid state; but get your muck-heaps to absorb as much of it as you can. Apply it also in abundance to the earth you have carted for bottoms to your muck-heaps, and, if well saturated, they will be valuable, although not mixed with muck at all. Convert it into solid as much as possible: by this means you prolong its action in the soil. But, when you do apply it in a liquid state, it has a good effect upon grass-land of every description; and, from the amount of its ammoniacal qualities, I have found it very beneficial to corn-crops whenever applied upon the land before ploughed up for sowing. Urine contains the essential elements of vegetables in a state of solution, and consequently in a state of the utmost possible preparedness, and is eminently suited to all crops which require speedy and large ailmenting with such saline and organic principles as it contains; but in a liquid state its operation is quick, but not durable.

I will now conclude with a few remarks upon other two descriptions of manure within reach of the farmer, and which well deserve attention, viz., the manure from the fowls' house and ashes from the fires. These are too valuable to be mixed with the farm-yard manure, they can be applied by themselves with much greater advantage. It has been computed that fowls' dung, weight for weight, is half as valuable as Peruvian guano, and that no description of manure is more deteriorated by decomposition; to prevent which, it ought to remain untouched until required for use, and gypsum or powdered charcoal sprinkled over it once a week, to prevent the escape of the ammonia. But without further remark, I will briefly describe a method of applying fowls' dung and ashes, which I have seen practised for many years with eminent success. The ashes throughout the year are collected in a heap, and with them a quantity of rich mould mixed; this is saturated with liquid manure from the tank as often as it requires. A week or two before turnip-sowing, the manure from the fowl's house is brought, also a small quantity of ground bones. These are all mixed together, and twice turned over, and incipient fermentation allowed to commence. It is then taken to the field; shallow ridges are formed, in the bottom of which the manure is planted in small handfuls from 9 to 12 inches apart, at the rate of 1½ to 2 tons an acre, according to the richness of the compost. This is performed by women with baskets. The seed is then sown with a machine along the ridges, after the manure has been lightly covered with a plough. So eminently is this adapted for turnips, that I never recollect seeing it fail—always producing a crop superior to any other plan, and even showing good effects upon the succeeding crop of barley.

I am afraid, Mr. Editor, I have trespassed too far upon your valuable space; I hope, however, the importance of the subject (however imperfectly treated) will be a sufficient apology for my intrusion. For although many farmers are very careful to turn everything to advantage, there are numerous others who—although readily admitting the necessity and propriety of so doing—are nevertheless very careless and indifferent in the performance of it. And if from a deficiency of chemical knowledge I have committed mistakes in the course of my remarks, still I think the accuracy of the principles I have attempted to lay down cannot be doubted—viz., that plenty of manure is a most essential element in good farming; that the care and management of manures produced upon the farm are much neglected; that the burning of vegetable matter is wasteful; that by allowing fermentation to go too far much loss is sustained; that liquid manure is of great value; and that fowls' dung and ashes deserve special attention: in short, that almost everything quite valueless in other respects is of value as muck; and that it behoves every farmer to turn to the greatest advantage the supply of manure produced upon his own farm before purchasing at the expensive and deceptive mart of the manufacturer and importer. And no watchword will prove a surer guide to the accomplishment of this object than that with which we introduced this subject—"Let nothing be lost."

WM. ARNOTT.

Melton, Woodbridge, Suffolk, Jan. 13.

ON THE METHOD OF EXTRACTING THE STARCH FROM THE POTATO.

The operations for this purpose are as follows:

1st, Washing the tubers.
2nd, Reducing them to a pulp, by rasping.
3rd, Pressing the pulp.
4th, Washing the rough starch.
5th, Draining and drying the produce.
6th, Bolting and storing.

1st. The washing of the tubers requires particular attention, any dirt left on them being injurious to the purity of the starch. The water itself ought to be perfectly pure and clear. An open cylinder, working in a trough, into which a stream of water can be constantly pouring, is the best method of effecting it.

2nd. The rasping is accomplished by cylinders made of sheet-iron, roughed by having holes thickly punched in it from the inside, so as to form a grater. Or, if a more expensive and durable machine is required, the cylinder is furnished with iron cutters, set in wood. This is placed under a hopper similar to that of a corn-mill. The cutting cylinder is made to turn rapidly—say from 600 to 900 times per minute; but the quicker this is done, the more effectual will be the separation of the starch, &c., in the tubers. The cylinder should be about 16 inches long, and 20 inches in diameter; and such a one, revolving by means of multiplying wheels 800 times per minute, will reduce 50 bushels of potatoes per hour to a perfect pulp. It may be worked either by water, steam, horse, or hand-power.

3rd. The pulping being effected, it is passed through a wire sieve; and the cellular tissues, which constitute the coarser parts, are separated, and must be pressed, to extract from it what starch still remains.

4th. Water is poured on the pulp whilst passing through the sieve. This is run into vats, in which it is allowed to settle. When quite clear, the water is poured off, and a fresh supply put on.

5th. When the starch is perfectly clean, the water is finally poured off, and the starch taken out, and laid on a perfectly clean floor, where it soon becomes hardened and consolidated into a firm cake, or mass.

The sixth process finishes the operation, by breaking up the mass into flour, and passing it through a bolting machine like those in a flour-mill, which prepares it for sale.

Any machinist is competent to fit up the necessary apparatus, either upon a large or small, cheap or expensive scale. No grower of potatoes to any considerable extent ought to be without this addition to his agricultural implements or machinery, especially in those parts of the country where it is difficult to dispose of a crop of unsound potatoes, and it may not be convenient to consume them by cattle or pigs. In such cases, the diseased tubers are scarcely worth the raising; and we have this season heard of instances in which the growers will not go to the expense of raising them. The money produce of manufacturing the potatoes may be stated as follows:

	£	s.	d.
1 ton of potatoes, or 2,240lb., produces, at 17 per cent., 3 cwt. 1 qr. 16lb. of starch, at £22 per ton	3	15	0
1 cwt. of residue	0	11	0
	£4	6	0

Against this must be charged the expense of manufacture, and the wear-and-tear of machinery, neither of which is at all costly, as they require neither skilled labour nor complicated machines.

Were it not for the excise, the starch, when extracted, might easily be converted into sugar by a chemical process, every cwt. of starch (112lb.) producing 140lb. of sugar. The process, however, is both complicated and expensive, and would only be remunerative upon a large scale, which is not the case with the manufacture of starch, which may be performed by women in even a less expensive mode (on a small scale) than the one we have described.

EXTRACTION OF FOOD AND STARCH FROM THE POTATO.

Sir,—I have read with great pleasure your observations respecting the extraction of starch from the potato; and as I have had much experience in the matter, having been, I believe, the first to introduce the manufacture into this country, as far back as the year 1830, I would beg to offer my testimony in favour of all you have stated, and strongly recommend to farmers the conversion of the potato not only into starch, but into food, which could be simply accomplished, even with the appliances which almost every farmer now possesses.

The paper which I send you—the *Irish Farmers' Journal*, of the 27th of May, 1846—gives a description of what was then put into practice at the South Dublin Union by the paupers, in producing food from diseased potatoes; and the facts are, I conceive, of paramount interest to every farmer.

Strange to say, the whole has lain dormant since that time, notwithstanding that not one word of what is set forth can be denied. It is incontrovertible that the actual nutritive value of food for man, to be had from the potato, is nearly four times that to be had from wheat, when the produce of each is taken from an equal extent of land. In other words, an acre of land cultivated with wheat will produce an average of—starch, sugar, gluten, and oil—1,055 lbs., whilst an acre of potatoes will produce, of the same, 4,076 lbs., each constituent being in nearly equal proportion.

Should you think right to insert this communication and the paper I send, I shall at another time put before your readers simple directions for the *modus operandi*; and some facts which may perhaps explain why so singularly advantageous a process, as well for the farmer as the public, has been suffered to rest unproductive.

I have the honour to be, sir, your obedient servant.

Jasper W. Rogers.

Peat House, Robertstown, Co. Kildare,
Dec. 27, 1857.

ARTIFICIAL PREPARATIONS FROM THE POTATO.

There is no other of our agricultural plants which have come in alternately for so great a share of eulogy and abuse as the potato. On one hand we hear of its being one of the best of Nature's gifts; and on the other, that to its general cultivation in this country we may ascribe most of the misery of its inhabitants. Notwithstanding all the discussion which has taken place on the subject, it is surprising that the real value of the potato should be so little understood. In its ordinary form it is one of the most perishable articles of food which we possess; but it is capable of being rendered, by artificial means of an extremely simple character, not only portable, but capable of being preserved for an almost indefinite period. There is, in fact, scarcely any other vegetable production capable of being made to assume so many forms or of being turned to account in so many different ways; but although this property has been long known to scientific men, it is surprising how little way has hitherto been made in putting the lower classes, who are forced to exist almost exclusively on a potato diet, in possession of this information.

The disease which made such ravages among the potato crop of last season has caused attention to be forcibly directed to these facts, and the conversion of the decaying portion of the crop into farina was a favourite project. It being known that the attention of Government was directed to the matter, numerous statements on the subject were placed before his Excellency; and among others one from Mr. Jasper W. Rogers, C.E., who had more than ordinary experience. That gentleman's plan was considered so very satisfactory that his Excellency the Lord-Lieutenant at once gave directions that facilities should be granted for having it fairly tested. Some of the results of Mr. Rogers' method of making the potato available as food, in many different forms, were exhibited on Saturday last, in the Board-room of the South Dublin Union Workhouse, before the Guardians and a number of other influential and scientific persons in the form of an elegant *dejeuner*, all the items of which, with the exception of coffee, were prepared more or less from the potato; when a most satisfactory account was afforded by Mr. Rogers, of the different processes in their preparation, with much interesting information relative to the value of the potato itself, which, he very justly observed, is too much overlooked. Every one present was astonished at the rich treat provided on the occasion, which consisted of soup, stirabout, milk porridge, jellies, blancmange, Spanish flummery, and pastry of all kinds, made, as we have already stated, principally of the produce of the potato, either as meal, flour, or fecula.

After the gentlemen present had partaken of the various preparations, Mr. Rogers observed that the preparation of the meal and flour from potatoes was so simple that it could be accomplished in the cottage of the poorest peasant. He then described the component parts of each food upon the table. The general proportion being one-half potatoes; some, however—viz., milk porridge, "Scotch bread," and rock biscuits—being entirely made from it; also the jellies, blanc-mange, &c., produced from the *pure fecula*, without animal matter of any kind—in fact, no addition but the usual seasonings. The soup, also, which appeared to be a palatable and nutritious food for the lower classes, was stated to be made of a small quantity of bacon, thickened with the meal of the potato, and which was capable of being made in a short period of time at a cost of about one farthing per pint.

Mr. Rogers then alluded to the general impression as to the want of nutritive power in the potato, and deprecated the publication of statements which were founded in error, stating that there was "little, if any, nutriment in the potato." He contended that the nutritive properties of the meal and flour of potatoes were almost, if not entirely, equal to that of wheat; and then gave the following analyses of each, assuming the constituents, for the support of animal life, contained in vegetables, to be starch, sugar, and gluten.

When converted into meal, the potato contains—

Starch and sugar..................	84·08
Gluten	14·82
Oil	1·10
	100·

While wheat, converted into meal, contained—

Starch and sugar..................	78·20
Gluten	17·53
Oil	4·27
	100·

Thus showing that the difference between the gluten was but 2¾ per cent., while the starch and sugar were more abundant.

The difference between "meal and flour of potato," prepared as recommended, and "farina," was pointed out. Farina is the starch of the potato, taken from the fibre, and contains nothing beyond the properties of starch; while the fibre, which is thrown away in the manufacture of farina, is rich in animal matter and oil, and by being combined with the farina or fecula, produces a meal or flour closely analogous to that of grain. This fact it was particularly necessary to bear in mind, in order to counteract the impression that there was but little nutriment in potatoes—a strange one, where so many millions lived on them as their only food.

A comparison was then entered into between the relative amount of food obtained from an acre of land in wheat and potatoes. On this subject, Mr. Rogers stated that he did not rely on his own experience, but cited the authority of practical men as to produce, and of eminent scientific men, as to the analysis of the respective crops, stating the following as the result of his inquiry:—

	Starch & Sugar.	Gluten.	Oil.
1 acre of Wheat	825 lbs.	185 lbs.	45 lbs.
1 acre of Potatoes ..	3427 lbs.	604 lbs.	45 lbs.

Thus it appears that potatoes will produce of meal and flour, FOUR TIMES, nearly, in weight, what can be had from wheat—a fact not generally known, but which could not be contradicted. He begged to impress this startling fact on the minds of those who heard him, and hoped to rescue the potato from the calumnies thrown upon it. In an establishment, such as the South Dublin Union Workhouse, containing from 1,800 to 2,000 persons, Mr. Rogers stated, that from fifty to sixty paupers would be able to prepare of potato meal and flour, by the simple means in operation, a sufficiency—say, four to five tons per week—for the use of the house, mixed with other meal, by which a saving would be made in the expenditure of the establishment of above £1,500 a year. He sat down midst much applause.

Sir Robert Shaw, Bart., who presided on the occasion, expressed his astonishment at what he had seen, and at the statements made by Mr. Rogers, as to the nutritive properties of the potato, compared with those of corn, which differed greatly from the impression which had been hitherto on his mind, on the subject. He would have supposed it impossible to put the potato into so many different forms as they had before them. They all owed great obligations to Mr. Rogers for the handsome manner in which that entertainment had been put before them, and in the name of the Guardians, he (the chairman) returned him thanks. He had brought most valuable information before them, which would be of great use if disseminated through the country.

Mr. Rogers returned thanks, and in doing so, observed that his great object was to render the manufacture of the potato general, henceforward, throughout the country—not alone for workhouses and jails, but that every poor cottier might be enabled to have his bread, his stirabout, and his soup, as well as his boiled potato—which could be done by teaching the people a most simple process, capable of being carried on in every cottage in the country.

Considering the large and influential body of gentlemen before whom Mr. Rogers so successfully exhibited the good account to which our much-abused vegetable may be turned, it is to be hoped that some of them, at least, will further test the advantages which he held forth. No better expedient could have been adopted for showing the value of the potato, in a way not likely to be forgotten; and it must be remembered that although it was extraordinary circumstances which caused the matter to be brought so forcibly under public notice, yet, under ordinary circumstances, it cannot be questioned that a portion of the crop may be converted into meal with great advantage, and be made the means of adding largely to the comforts of our peasantry.—*Irish Farmers' Journal*, May, 1846.

TITHE COMMUTATION.

SIR,—As many of your readers may feel anxious to know the result of the corn average for the seven years to Christmas last, published by authority in the *London Gazette* of the 8th inst., viz.—

Wheat	7s. 2¾d.	per imperial	bushel.
Barley	4s. 3½d.	"	"
Oats..............	2s. 11d.	"	"

I beg to state, for their information, that each £100 of tithe rent-charge will, for the year 1858, amount to £105 16s. 3½d., which is a little more than 6 per cent. above the last year's value.

The following statement, from my forthcoming "Annual Tithe Commutation Tables," will show the worth of £100 of tithe rent-charge for each year since the passing of the Tithe Commutation Act, viz.:—For the year

		£	s.	d.
1837	.. ..	98	13	9¾
1838	.. ..	97	7	11
1839	.. ..	95	7	9
1840	... .	98	15	9½
1841	.. ..	102	12	5¼
1842	.. ..	105	8	2¼
1843	.. ..	105	12	2¼
1844	.. ..	104	3	5¼
1845	.. ..	103	17	11¼
1846	.. ..	102	17	8¾
1847	.. ..	99	18	10¼
1848	.. ..	102	1	0
1849	.. ..	100	3	7¾
1850	.. ..	98	16	10
1851	.. ..	96	11	4¾
1852	... .	93	16	11¼
1853	.. ..	91	13	5¾
1854	.. ..	90	19	5
1855	... ...	89	15	8¾
1856	.. ..	93	18	1½
1857	.. ..	99	13	7½
1858	.. ..	105	16	3½
	22)	£2,178	2	6¼
General average for 22 years	..	£99	0	1¼

I am, sir, your most obedient servant,

CHARLES M. WILLICH,
Actuary University Life Assurance Society.

25, Suffolk-street, Pall-Mall, Jan. 9.

THE DIFFERENT SYSTEMS OF DRAINAGE.

We are sometimes told that farmers ought to leave their habits and prejudices at home, and come to the discussion of an agricultural subject, exactly as a lobster would if divested of its shell. Let us see how much a meeting conducted on such terms would be worth. The cultivation of a dark, strong, homogeneous clay, affected entirely by water on its way from the heavens downwards to the sea, and where the principle has been to remove this as quickly as could be effected by open parallel furrows on the surface, a few feet distance only apart, and intersected by parallel open drains, in a cross direction, some 20 or 30 yards asunder. Such a system with one man is the only drainage that he requires to effect his object.

The cultivator from another district (probably the oolitic), where the soil is a dark tenacious clay at top, and an open, porous, or absorbent soil below, is satisfied with any depth of drain, provided it is deep enough to penetrate the retentive soil lying above, so as to give the water free admission to the porous subsoil below. Another, who lives in a district of greatly undulating surface—with a porous subsoil on extensive or dislocated portions, and intersected at all angles with beds of tenacious clay lying at various depths and thickness—the porous portion supplied and overcharged with water, endeavouring, by its own gravity, to force its way through it from the highest to the lowest level, and constantly endeavouring to escape upwards from its disposition to find a level, or rising to the surface by capillary attraction whenever the disintegrated particles rest on quicksands below, already highly charged with water—the resident in such a district says that nothing but *deep*-draining will answer, the *distance* apart being only secondary; but nothing less than four-feet drains, and in many instances even twice that depth, will suffice to rid the subsoil of its injurious occupant.

Again, we have the farmer from a country where one uniform flat surface prevails, and regularity of subsoil, are each of themselves equally remarkable features; and he requires drains as near to each other, in point of distance, as can be effected—6 yards apart at most, and from 26 to 36 inches in depth, running parallel to each other throughout the whole field. This mode he has found to answer his purpose, and he has no doubt will equally answer for everyone else.

And thus might we multiply instances without end. But as a few invariable and unerring principles are connected with the subject, we will endeavour to record them.

1st. The specific gravity of water is 817 times heavier than air.

2nd. By its gravity it always has a disposition to descend; but the instant it meets with resistance it exerts its force equally in every other direction.

3rd. That force is invariably exerted until it has found a level, and it can then only be said to be at rest.

4th. That whenever this equilibrium is attained, it remains in that state (stagnant) until disturbed.

5th. That in perforating the soil with a drain, that portion nearest the drain is first set in motion, and this is followed in successive rotation by the next nearest portion, and so on to the extent of its action.

6th. That its action ceases wherever the compactness of the soil is sufficient to overcome the gravity of the water held in it by suspension.

6th. That water not only descends by its specific gravity, but ascends by capillary action; wherever the lower portion of the soil rests in water, the complete disintegration of its particles facilitate that object.

7th. That water passing from a higher to a lower level through the soil, always has a tendency to rise to the surface, and would invariably do so unless intercepted by open or underground drains—hence the origin of springs.

8th. Water, on reaching the surface of the earth, would continue to descend in the soil until resisted, which it invariably would be whenever a porous soil was preceded by a retentive one.

9th. That water in its purest state, as rain water, is slightly charged with ammonia; but to an inconsiderable extent, excepting after long seasons of drought.

10th. That water becoming stagnant in a soil, becomes deleterious to plants growing upon the surface, the mineral deposits, especially iron, after entering into its composition, rising towards the surface.

11th. That water passing through a hollow pipe meets with resistance produced by friction. A pipe filled at one end cannot be made to run full at the other.

12th. That water in a drain, upon meeting with resistance, will fill it continuously upwards until the weight of the column of water overcomes such resistance by the pipes giving way at the lowest point.

13th. That the velocity with which drains discharge themselves depends upon their inclination and the permeability of the soil.

14th. The specific gravity of water being greater than that of air, it invariably displaces the latter in the soil; but upon its removal, air again occupies the space originally held by it, and thus a continuous action is produced in the soil.

15th. Water when frozen expands, and thus, by its power, the hardest substances become broken up, or have their external surfaces abraded by its action.

The foregoing is merely a statement of those principles which will ever be coming into operation during the processes of draining; and by observing which the operator can seldom err. Of all scientific practices, that of draining is of itself the simplest of application; the merely perforating the subsoil with a hollow drain, at a sufficient depth must necessarily draw off the accumulation of water held in suspension in the adjacent soil. If this be tenacious, from thirty to thirty-six inches, in most cases, will be sufficient, keeping in mind that, although a greater depth might be desirable, the cost of the drainage ought always to govern the proceeding. On the contrary, if the subsoil is porous and charged with water, flowing from a higher level, then the drains must be sufficiently deep to carry off the water, that the soil near the surface may not be rendered wet by capillary action, bearing in mind that the more complete and minute the disintegration of the soil, the greater the disposition of the water from below to ascend towards the surface. In some cases drains from forty to fifty inches will be requisite.

In soils alternating in quick succession of beds of gravel, sand, and clay, a few deep drains judiciously placed will generally effect the drainage of large portions of a field, remembering that the drain should always be cut so as to intercept the water passing in the gravel or sand before it reaches the clay, and in a parallel direction with the edge of the deposit. In some cases the merely perforating the clay in one continuous line from one gravel bed to another to the lowest level will also equally well effect the object. The drains must invariably be deep enough to release the gravel altogether, and a previous knowledge of their extent and situation ought to be ascertained. No other description of draining is so difficult to perform as this, or when done, repays so largely for the operation. We might go on multiplying precedents *ad infinitum*; but it is not our intention to raise discussion, so much as to point out general principles to obviate it.

Water is the source of sustentation of the animal and vegetable kingdoms. The agriculturist, more especially than all others, becomes subjected to its influence. The smallest quantity, either in excess or deficiency, is to him severe injury or proportionate gain. If, therefore, we have cleared away any of the impediments by which its withdrawal can be effected, we have not toiled entirely in vain, even if we only succeed in obtaining attention.

REGENERATION OF THE POTATO BY CUTTINGS.

[TRANSLATED FROM THE FRENCH OF THE "JOURNAL D'AGRICULTURE PRATIQUE."]

The *Agricultural Chronicle*, of the first fortnight in December, has in a spirited manner exposed both the precipitous haste of the searchers after the philosopher's stone, and the emptiness of those brilliant panaceæ which are produced on all sides as soon as a question of a somewhat serious character has been brought before the public. But all this noise quickly subsides when the cause which has occasioned it is removed, and we trouble ourselves as little about it afterwards as before. We knew of no means of preventing it, and submitted to it with every symptom of impatience; but we do not take into account the possibility of its return. What an agitation was caused on the occasion of the potato disease, of the scourge that attacked the vine, of the disease which was announced in the beetroot! Is there any other produce which is not justly entitled to solve this important problem—"*Life at a cheap rate*"? But how prompt are all voices, erewhile so noisy, to become silent or to change the theme! One question expels another even to forgetfulness, without the confusion it occasioned having conducted to any good end.

"A mountain in labour uttered a cry so clamorous,
That every one ran at the noise, believing
It was about to be delivered of a city greater than Paris.
It brought forth a mouse!"

The potato disease is exhausted, and, thank God, tends to disappear*. It has been this season less general and less intense. We have spoken of it much, but it now engages much less of our attention. "Remedies are powerless to heal this disease," said the *Agricultural Chronicle*, of the second fortnight of August; and, in its turn, silence threatens to invade this question. We love to see a thing worthy of attention remain "the order of the day" to a complete solution. Whilst we have not found any means of preventing the return of the potato disease, we think there will be great utility in bringing it forward again: "It is the dead only that it is needful to bury." Besides, we are probably not far from the end.

A practical man, learned and modest, began in 1849, experiments, which he has renewed every year since then, having no other object than "the regeneration of the potato." His labours deserve to be known, and his experiments have need to be repeated by a great number, in order to be either confirmed or invalidated. In a word, they ought to be either repulsed or accepted, according as numerous facts, everywhere observed, and collected, establish or confute them.

M. Décoste, a former military veterinary surgeon at Sésanne, states that walking in his garden wholly occupied with the continuance and serious nature of the potato disease, the idea struck him of cutting some stalks of that plant, and pricking them into pots filled with mellow earth. He was quite in ignorance as to what this first attempt might lead; it was only a pilot balloon, and it went forth without pretension or interruption. The only thing that the experimenter proposed to himself was to observe carefully and note down exactly, all his observations. The result was favourable. M. Décoste had the satisfaction of seeing that most of the cuttings that he had planted followed the ordinary phases of vegetation. He obtained from them small, but perfectly healthy tubers, which he afterwards employed in making new experiments. Seven years of consecutive culture have filled M. Décoste with hope and confidence that he is possibly on the eve of a useful discovery, interesting in the highest degree to the agricultural world; and it is certainly the least we can do to give him the opportunity of rendering an account of his experiments:

"'Of all the means employed for multiplying the good qualities of the potato,' says Parmentier, 'and to prevent them degenerating, there is none more efficacious than sowing the seed. It is necessary from time to time to renew and perfect in this manner the species we intend to regenerate and propagate.'

"Unfortunately a multitude of experiments have invalidated this assertion, and proved that the seeds have produced crops of diseased potatoes.

"Up to the present time the process by cuttings appears to have a better chance, and offers more certain guarantees for the crop, than a perfectly healthy sowing, and of which the ulterior products should be exempt from the disease. Is it not, to say the least, to this conclusion that the results of the following experiments lead us?

"*First Year.*—In the month of August 1849 I pricked four cuttings of potatoes into a pot filled with a mixture of earth and vegetable mould. The stalks, preserving their verdure, gave out vigorous shoots. Towards the beginning of November the leaves faded from maturity, and the stalks became dry, as at the termination of all healthy vegetation. I then turned out the pot, and rummaged amongst the earth, and found at each of the cuttings there were tubers, healthy in appearance and varying in size from a hazel-nut to a walnut.

"*Second Year.*—In April, 1850, I planted the small potatoes produced from the cuttings of the previous August, 1849. In July following I took from vigorous and luxuriant shoots a number of cuttings, which were planted in different kinds of earth. This was undoubtedly the most effectual means of ascertaining the precise value of the process, either confirming or invalidating the results of the preceding crop.

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* This was written in 1855.

"Placed in conditions more generale, and consequently less exceptionable than in 1849, these cuttings yielded to the common laws of vegetation; they faded before they resumed that vigour which had led me to select them; but this weakness of the stalks was of short duration. These soon recovered their primitive strength, and threw out in good time new shoots full of sap and hope.

"I was impatient of success, and wished to detect the facts in their progress and development, if I may so express it. During the first days of October I took up some of the cuttings, and already the roots showed themselves well furnished with small tubers of healthy appearance. There was nothing to do but to leave them to increase in size and reach maturity; and in November I gathered potatoes of excellent quality, and weighing on the average from 30 to 34 grammes (about 1 oz.).

"*Third Year.*—The crop of 1850 furnished me with the seed of my plantation of 1851, which was made in April, like the preceding one. The 5th of July I took cuttings, which were again pricked into various kinds of mould; the crop was taken up on the 20th of September, before completely mature: it was at once abundant, and fine in the quality of the tubers, which were sent, with the cuttings attached, to the exposition of agricultural products of the Agricultural Society of Chalons-sur-Marne.

"*Fourth Year.*—The potatoes of the harvest of 1851 were planted the 25th of March, 1852, namely—1st, in dry sand, such as is used in paving the streets; 2nd, in a sandy earth; 3rd, in a calcareous earth; 4th, in an earth with clayey subsoil; 5th and lastly, in an earth said to be of good quality, both by nature and its state of cultivation.

"The 10th of June I separated cuttings which I planted in the same soil as that of the plants from which they were taken.

"According to the proportions, the crop was satisfactory in each kind of soil. The cuttings pricked in the dry sand were frequently watered. The tubers had a thin and glossy skin, a firm and close pulp containing little vegetable water, and presenting to the taste the flavour of potatoes of first quality.

"Towards the 25th of July I had been able to take new cuttings from the first, and plant them in their turn, and I obtained from them a crop as abundant and fine. The vegetation of the first cuttings was so active and vigorous that I have measured stalks from half a metre to one metre in height (or from 15 to 30 inches). The tubers taken from the good earth weighed from 150 to 235 grammes (or from 4¾ to 7½ oz.).

"The experiment of 1852 presented this peculiarity, that the planting produced three crops in the same season, one the produce of the tuber itself, the two others from successive cuttings.

"The facts have been repeated precisely the same in 1853, 1854, and 1855, and they appear so much the more conclusive that they have left nothing to wish for, either in regard to the abundance of the crop or the good quality of the tubers. The disease has not appeared during the vegetation of the cuttings, and the potato obtained was excellent to eat and easy to preserve."

If we were allowed to give our conclusion, we should say:

From these seven years of conscientious experiment it follows that from potatoes planted in March or April we may in June or July take from each bunch some stalks, plant them with the precautions usual in like cases, and in the following October obtain from the cuttings a crop equal to that of the primitive plantation without the latter suffering from it in any manner whatever. In reality, the separation of the branches is made sufficiently above the soil to allow of there remaining on the stalk, thus cut, most frequently two eyes (axil of the leaves), from whence spring new shoots, which will amply suffice, with the non-mutilated stalks, for the complete development of the plant and the proper evolution of the tubers it ought to produce.

"The pulling of the bunches of potatoes proceeding from the cuttings has constantly yielded a crop equal to that of the bunches which had not had their stalks suppressed.

"In the diseased potatoes the first signs of the disorder exhibit themselves upon the stalks which first turn yellow, and sooner or later acquire a deep brown colour, then quite black and easy to be perceived. Sometimes, however, in times of drought, the spots, instead of turning black, assume a less decided tint, and become bleached, whilst the stalk dries up.

"In making cuttings for transplanting, we choose carefully the most vigorous branches upon the most healthy stools. In this above all lies the advantage of the process; for if in the number of cuttings any diseased stalks are selected, they will soon be endangered; the vegetation will be arrested, the branches dried up, before they are able to produce anything. The disease will thus be stifled in its birth. This is wonderfully explained. Once separated from its centre of life, the stalk that is about to be planted needs all the integrity of its organs, to attract and to assimilate to itself, after a proper elaboration, all the materials necessary to its development, and the complete evolution of all its parts. The diseased stalk offers none of these conditions, so indispensable to its preservation, for the parts most essential to its existence are the most affected (epidermis utricles fibres of the Endophlæum, &c.); consequently it is soon weakened, and ceases to live.

"By the process of cutting, therefore, we should have no more to fear from diseased seed, since we can make use of no other than perfectly healthy plants.

"In any and every case the cuttings seem to possess a very great and real advantage over seed, even on the supposition that this latter (what experience does not warrant us in believing) offers all the guarantees desirable for the regeneration of the plant so deeply affected. In fact, in order to renew the plant by way of sowing, it is necessary to wait the crop of the seed, and thus lose a whole season; nor is it less necessary to obtain it of good quality; and upon that point the uncertainty lasts during a whole year. With cutting, on the contrary, we obtain two crops during the same season.

"Let us not forget to state that it is indispensable to allow to the cutting as many eyes as possible, for from this part of the stalk spring the tubers. The abundance of the crop is consequently strictly dependent on them.

"The culture of the cuttings presents nothing particular, demanding only the ordinary conditions required otherwise by all the weeded plants—a light and deep soil, that yields easily to the development of the tubers.

"In case of drought, it speaks for itself; we must not neglect to water at the commencement of the planting.

"One more word, in conclusion. Admitting that the reproduction of the potato by cutting gives only the means so much sought after, of regenerating that plant, our experiments will not less have demonstrated to a certain extent, that with a single sowing we may crop several times in the same season. Had we obtained only this result, still we should have congratulated ourselves on having devoted seven years of experiment in finding it. Let others now add to the facts which we have collected, by renewing them, the sanction they necessarily require before being adopted in the general agricultural practice."

The wishes of M. Décoste will certainly be heard.

Agriculture has ceased to be a practice of mere routine; and it knows how to fulfil the task imposed upon it. It has suffered too much from the scourge to which M. Décoste believes he has discovered a preventive, not to submit to attempts conclusive, by their importance, the easy means which is recommended to it by a conscientious experimenter, and, better still, by a wealthy man.

(Signed) Eug. Gavot.

WENLOCK FARMER'S CLUB.

LECTURE ON ARTIFICIAL MANURES, BY PROFESSOR VOELCKER.

A meeting of the members of the Wenlock Farmers' Club was held at the Raven Inn, on Monday, Dec. 21, to hear a lecture on the "Agricultural and Commercial Value of Artificial Manures," by Dr. Augustus Voelcker.

Dr. Voelcker commenced by observing that there are two classes of persons who, upon the subject of the utility of agricultural chemistry, entertain diametrically opposed opinions. One of them think nothing more is necessary for successful farming than to read one or two books upon agricultural chemistry, and perhaps Mr. Mechi's letters, or some similar popular treatise, containing a strange admixture of science and practice; and this kind of knowledge they believe will enable a man to dispense with that vast amount of experience which every one who has tried his hand at farming knows is requisite, no matter how clever a man may be, if he would make a living by farming; while the other class think that agricultural chemistry, like all other sciences, is, to use a plain word, all "humbug." The truth here, as in many other things, lies in the middle. A mere knowledge of science will never make a man a good farmer; but at the same time, it is of very great advantage if, in addition to practical experience, he has a knowledge of the principles of science. Moreover, young men with a scientific knowledge would make much greater progress in useful experience than others who were ignorant of the principles of chemistry. The great utility of science to farming is not so much direct as indirect—it does not dispense with that practice, without which no excellency could be acquired, but enables the farmer to make better use of it. Very frequently, in lectures of that description, the mistake was made of aiming at too much—a large number of subjects were mixed up together, and the audience went away more or less muddled. It was also not unfrequently thought that in order to make an impression a little exaggeration was necessary. The very fact, however, that this club had existed, and kept up with spirit for a number of years, was a sufficient reason, if he had no other, why he should not attempt in this way to create a little temporary excitement. He should confine himself to one very important subject—that of artificial manures, and attempt to convey some views on the subject, which he trusted would be of some use in their practice as farmers (Hear, hear). There could be no question as to the great improvements which have taken place since artificial manures have been introduced into farming. The great demand for artificial manures is the best proof that in many instances they have not been misapplied, for no man will spend money for a succession of years upon something which brings him no useful result. The fact, therefore, that new companies and new businesses are started almost everywhere, proves that artificial manures, when judiciously applied, are a great boon to the agricultural community. Within the last three or four years manufacturers of artificial manures have sprung up like mushrooms, and it was therefore not to be wondered at that some inferior descriptions have been offered to the notice of the farmer. It must also not be forgotten that in many instances artificial manures have proved complete failures. The question, therefore, arose, What is the reason of these failures? It was not always easy to discover the reason. In some cases artificial manures have been injudiciously applied; *i. e.*, in too large or too small quantities. He had seen guano used in quantities that would certainly do more harm than good—too large, that was, for the soils or crops to which it was applied, to the exclusion of farm-yard manure and other manures more suited for root crops. In passing, he observed that guano should not be used generally upon any soils for crops dependent upon the development of the roots. For turnips, mangolds, and other root crops, the manure should have a large proportion of bone material—phosphates, as the chemists called them. In some cases again, the failure must be attributed to the artificial manure which has been supplied; and he grieved to say that in the present day there was a much larger number of inferior than superior kinds of manures sold. The diagrams would show the analyses of different kinds of manure. One of them was the London Economical, which at one time made a great noise, and was used in different parts of England and Scotland. It was accompanied by a small volume of testimonials, all speaking of it as a most efficient manure; whereas it contained nothing which was known as possessing fertilizing properties in a very high degree. If any good effect had therefore been produced by its application, it must be attributed rather to the good farming, or to an uncommonly good season, which, as was well known, often was more effective than the best manure (Hear, hear). And indeed it was almost impossible by experiments, continued even for two or three seasons, to ascertain the practical value of a manure; but in the long run a really good manure will be found out. He remembered the time when there were almost as many people against guano as there were now for it. Not very long ago hardly any purchaser for bones could be found; and even now no bones were used on the continent, hence the large importations of that article to this country. Everybody knew that artificial manures were more efficacious under some circumstances than others; and why? Because the effect produced by artificial manure would be just in proportion as it supplied the ingredients which were deficient in the soil. Artificial manures sometimes failed too, by reason of the mechanical condition of the land being such that it could not produce its legitimate results. For instance, fresh bone-dust does not act upon the soil at all for the first year, very little the second, and only a partial effect the third. For want of sufficient air the material remains very much in the condition after the first six or twelve months in which it is put in. Excess of moisture was often another reason why manures were unproductive. Without good draining no amount of artificial or natural manure would produce a very large crop. It would be seen then that the practical efficacy of artificial manures is known by a variety of circumstances; and it would also be clear that the commercial value of artificial manure does not necessarily coincide with its practical efficacy—the commercial value of artificial manure being much more fixed in its character than the practical value. For instance, under some circumstances lime produced an astonishing effect upon the land; in other cases none whatever. In the neighbourhood of Cirencester no good farmer limes; and upon examination the soils are found to contain sufficient lime to meet the requirements of the growing crop. In the generality of cases, however, the soil does not partake of the character of the subjacent rock —most of our soils being soils of transportation, and do not belong exactly to the rock on which they rest. Hence a general geological knowledge will not be a sufficient practical guide—nothing short of an examination of the surface will decide when a man should lime and when not. The practical efficiency of artificial manure is determined by experience, and does not necessarily coincide with the price at which it is bought in the market, but on its particular adaptation to the land where it is applied. In most soils phosphoric acid was deficient, and hence really effective manures contained a very considerable proportion of phosphates. Again, in some descriptions of produce—corn, &c.—ammoniacal matter was of very great utility, because ammoniacal ingredients were generally deficient in the soil. It was also found that alkaline matter, potash and soda, produced very great effects when applied to the land. This was the conclusion, then, to which they must arrive: phosphates, and substances which, on decomposition, are ready-formed ammonia; substances containing nitrogen; and alkaline matters, more especially potash, are the most universally efficient manures. These are also the more expensive manuring constituents, so that to some extent the practical and commercial value of artificial manure go hand in-hand; but, on the other hand, it would be wrong always to determine what you should pay for artificial manure by the effect which it produces. In some cases he had seen superphosphates applied upon lands which contained in themselves a large quantity of phosphates, and therefore the extra supply did no good whatever. These, however, were exceptional cases, and did not often occur. The question—and a very important one it was—then arose: what description of manure ought you to use? and secondly, what ought you to pay for a manure of a certain character! No person should understand so well as the farmer himself what is really required for his particular farm; and in practical matters no fixed rule can be laid down. Some general hints may be thrown out which have been collected from a number of experiences in various districts, which are useful as a basis; and it is from the experience of farmers living in many counties in England and Scotland we know that, generally speaking, ammoniacal or nitrogenous matters are peculiarly beneficial to corn crops. In making this statement, he left entirely untouched the question whether mineral substances are not an advantage in some instances for corn. He knew that they were. But, on the whole, substances rich in nitrogen are applied with great benefit to corn crops. Hence good rotten dung was better than fresh manure, because weight for weight it contained a larger amount of nitrogen. He wished them to understand that he did not recommend well-rotted dung under all circumstances; because it was generally better to take the manure as fresh as possible, and get all that was valuable out of it upon the land. But because rotten manure contained a larger amount of nitrogen in the shape of ammoniacal salt, it generally produced greater effects than the fresh. So with guano—a small quantity of this produced such extraordinary results, because it contained in one cwt. as much ammonia as a ton of well-rotted farmyard manure. The effect of manures did not depend upon anything mysterious. Manure from half-starved animals would never be very good, no matter how much it was turned, and it was not the mere rotting that made it good. In good Peruvian guano there was from 16 to 17 per cent. of ammonia. It was important that they should recollect that there was a great difference between good Peruvian guano and that which had been brought over since the best layers had been cleared away. In good guano there was also a large proportion of phosphates or bone earth. The solid part of bones consists of phosphoric acid and lime, and this would explain why it is that good guano produces a good effect upon turnips. Experience had likewise shown that phosphoric manures were especially beneficial to root crops—bone dust and some inferior kinds of guano, having phosphate of lime as their characteristic constituents, were the manures best adapted to turnips, mangolds, et cetera. Alkaline salts was a very good manure for root crops. It would be admitted by all who had any experience in the application of artificial manures, that guano and superphosphate were the two most valuable, in a commercial point of view, that could possibly be used in agriculture. Guano, it was well known, was the most successful agency they could apply to wheat or grain and grass lands, while superphosphate was most applicable to roots. Saldanha guano, which was cheaper than the best Peruvian, produced a better result when applied to roots, because it contained more phosphate. If they depended entirely upon guano they would have too much leaf and not sufficient bulk. A series of experiments which he had continued for four years convinced him that they could not dispense entirely with ammonia for root crops, but it produced frequently more harm than good. To spend, therefore, a large sum in buying ammonia (which is a very expensive material) for root crops was to make a great practical blunder; for phosphate was one-seventh the cost, and produced infinitely better results when applied to roots. Commercially speaking, ammonia is the most expensive ingredient used in superphosphates. Alkaline salts, which are occasionally found in artificial manures, are likewise expensive materials—too expensive, in fact, to be used with advantage in agriculture. For this reason most artificial manures do not contain any appreciable quantity of these expensive salts—the effect they produce upon the land is not commensurate with their cost. Bearing in mind, then, that the value of artificial manures is to be estimated by the amount of nitrogen (ammonia) and phosphates which they contain, there would be no difficulty in applying this test to the different manures sold to farmers. The Economic Manure, to which he had referred, contained very little of these ingredients. A sample of Mexican guano (as would be seen from the diagram) contained only 18 per cent. of phosphate of lime (one-third of that contained in bone dust) and a mere trace of ammonia. Another manure, advertised as the very essence of Peruvian guano, consisted chiefly of burnt clay, carbonate of lime, and a little sheep's dung. (Laughter.) The learned professor then directed attention to the diagrams showing the composition of the best guano (for corn) and the best superphosphates for root crops. These manures varied considerably in their component parts, and their effect when applied to the land must also be vastly different. In one of the samples it would be seen that there was not more than a fourth as much phosphate as that contained in another sample. In the highest there was no less than 40 per cent. of soluble and insoluble phosphates, and this could not be sold for less than £12 per ton. With this exception the other manures—though varying so much in quality—were about the same price, from £6 to £7 10s. How could you ascertain which really was the most valuable article? To take it up, and smell it, in order to discover its quality, was simply ridiculous. In the course of the year he examined some hundred specimens of superphosphates; yet he had not yet attained to that practical acquaintance with it to be able by looking at it to ascertain whether it was good or bad. They all looked very much alike, and smelled more or less disagreeable. In nine cases out of ten, as he had said, the farmer wants either guano or superphosphate, and he should confine himself to these manures. As to guano, when farmers buy this they ought to receive in writing a guarantee that it really is genuine Peruvian with which they are supplied. But if there is any suspicion, a very simple test would prove whether it is well grounded or not. A trustworthy opinion of its genuineness could be obtained at the moderate expense of seven or eight shillings. Without this, however, good Peruvian guano has such marked qualities, and varies so little in its composition, that any one may for himself ascertain its quality. When burned it should leave one-third of itself a perfectly white ash—adulterated guano produces more ash, and is coloured; this ash, on being dissolved in acid, should leave no perceptible amount of sand. At any rate, it would be easy to obtain in writing from the dealer a guarantee that what he supplied is genuine. Superphosphate is a manure that can be produced in a variety of ways, its efficacy depending, unlike that of guano, on the amount of phosphates it contains; and not only upon the amount of material, but upon the state of preparation it has undergone. Between soluble and insoluble phosphates there was a great difference, not only in their efficacy, but in the expense to which the manufacturer is at to produce them. Manuring constituents to enter into plants must become soluble; phosphates, when in a condition to be readily taken up by plants, must be far more efficacious than the same constituents in a state in which they cannot be absorbed by the rootlets. To illustrate this, a valuable raw material was coprolite, or fossil remains, which had been not altogether correctly termed coprolites. That term signified the petrified excrement of animals; but the substances known as coprolites were in reality the fossil bones of those animals which in distant ages inhabited the regions where they were found. They were also more correctly known by the name of pseudo-croprolites, and were in reality nothing more than fossil bones. With regard to their composition he might observe that they did not contain any organic matter; they contained only mineral substances, and amongst others phosphate of lime. In its crude state, however, this phosphate was of no use whatever; it produced no effect, no matter how finely it was powdered. He had tried it repeatedly, some eight years ago; and although finely powdered, it remained insoluble, even when attacked by acetic acid. Hence there was always some risk of having a portion of insoluble and useless material in superphosphates. Bones were rendered only soluble by expending large sums of money in buying expensive acids; hence soluble bone earth is worth at least three times as much as it is in its crude state as insoluble phosphate. It may be asked if, when these acids came into contact with the tender fibre of the plant, would they not be injurious to it? There was, however, in most soils a natural provision against this; there was generated in the soil lime, or oxide of iron, or alumina, or some other constituent, which neutralised any such effect. Even oil of vitriol was soon dispersed and neutralised by these constituents. When applied to land, therefore, the superphosphate became insoluble. Hence it did not enter into the composition of the plant as applied. But they would be inclined to ask what was the value of the manure if it did not enter into the composition of the plant immediately on its application? To this he would reply that the great value of superphosphate was owing to its sub-division, for in its finely divided condition it possessed properties differing very materially from ordinary insoluble phosphate of lime. The lecturer took a solution of bone dissolved in acid, to which he added ammonia. The result was, that the whole of the phosphate was rendered soluble, the solution appearing to be converted into a thick glutinous mass. In this finely-divided state, it was easily taken up by the plant. This he illustrated by adding to the precipitated phosphate some strong vinegar (acetic acid), when the whole was instantly dissolved, although this comparatively weak acid would scarcely have had any action on bone-dust, if applied in the first instance; thus showing that by resorting to this mode they obtained the advantage of more energetic action. Pounded or ground bones could never be divided into such fine particles, or spread so squally or evenly over the soil, as could be accomplished when dissolved in the manner he had described; and their bulk greatly increased, for the one was mechanical action and the other was chemical. When bones were used first it was usual to break them into one-inch pieces; when they became dearer they were reduced to one-half the size, for the farmer discovered that when more uniformly spread half the quantity was just as good. And so in the application of artificial manures—it was everything to have it, not here and there, but well distributed, so that the roots of the plant could reach it, and take up the ingredients congenial to its growth. Some persons contended that it was an advantage to have a portion of the phosphate insoluble, in order that it may remain after the rain had washed away the soluble portion, to maintain the after-growth of the plant. This was all moonshine and theory, and never could have been founded on practice or correct principles. It was certainly a most convenient doctrine for artificial manure manufacturers to say that it was as well, and better, to have a portion insoluble, because the more soluble the phosphate was the more expensive it was. The conclusion, therefore, to which he would lead them, was this: In buying superphosphate, let them ascertain that they had a large proportion of soluble phosphates. There was no reason why the farmer should go to the expense of an analysis; let the dealer supply one; it was his business to show what he had to sell. If a dealer had an objection, and said, "My manure is as good as anybody else's, but I cannot tell you exactly how much soluble phosphate there is in it," they may be sure that in nine cases out of ten he had not a very good article to show. In the absence of an analysis, the dealer should be required to give a guarantee that it contained so much of soluble phosphate; for upon this the value of the manure chiefly depends, and not only upon the amount of its various constituents; analyzation, therefore, was not always a sufficient test of the full value of a manure, although of course the material must be present to have a really efficacious manure. He was most anxious to point out how desirable it was that the farmer should not be content to buy his superphosphate, relying entirely upon the respectability of the dealer. Frequently the dealer may be a very honest man, and yet may not know himself what he is selling; the manufacturer himself may be a perfectly trustworthy man, but he may have some very erroneous notions as to the relative value of soluble and insoluble phosphate; and such ideas may not enable him to produce so cheaply an effective manure as another manufacturer. The farmer is not to pay for the character of the dealer or the manufacturer, but for the character of the manure (Hear, hear). The cheaper he could get it the better, but by all means secure a guarantee. These few practical hints he hoped would be of advantage to them in purchasing artificial manure. It was only by these means they could check the nefarious practices which now and then are attempted upon the farmer. The adulteration of guano had been practised last year to a far greater extent than he had ever known it before—as many as three-fourths of the samples he had received were adulterated; on the other hand. superphosphates appeared to be getting more valuable, and this he attributed to the general demand which was now made for guarantees. After thanking them for their attention, the learned professor resumed his seat loudly cheered.

The CHAIRMAN said he was sure all felt equally with himself much indebted to the learned gentleman for his able and lucid address. He had never heard a plainer elucidation of the principles which rendered artificial manures of importance to soils. There had been lately discovered, as of course the Professor was aware, some large deposits of guano at Kooria Mooria, in the Eastern Seas; and it appeared that there was now upon the seas something like 100,000 tons of this guano. From the analysis, it appeared to be equal in ammonia to the Peruvian, and, like some of the other guanos, to have a larger proportion of phosphates. They would all readily agree that it was to the root-crops they must chiefly look; and not only how best to prepare the land for the present crop, but how to get it into good condition for the subsequent produce. He did not gather from the lecture whether ammonia was so volatile as to be less available for subsequent crops—whether it was all absorbed by the cereal crop; and this was a very important question for the farmer. Peruvian guano, at its present price, was almost a forbidden fruit to the farmer; and it was certainly worth inquiring, whether the ammonia, which made it valuable, benefited the land beyond one crop. It was most important that they should know that this expensive manure was not adapted to root-crops; for, if they could buy a better article for little more than half the money, why should they not do so? It would be a great advantage if farmers could be got to adopt some rule; but of all men on earth to get to stick to a point, farmers were the most difficult. If you talked to half-a-dozen different men, you would find that they each entertained a separate opinion; and nothing would induce them to take any trouble to ascertain the truth. It might not be very agreeable to hear this; but it was quite true. The result of that day's market, when the farmer was offered 6s. 6d. for his wheat, was not very agreeable: it was not calculated to make him very happy, seeing at how much trouble and expense he had been to rear it. Their duty clearly was to be as saving as possible—to ascertain which was the best manure, and to buy that, and not confide altogether to the character of the dealer. Nitrate of soda was some time ago highly recommended as a manure for cereal crops; and, as he understood there was a large supply on the coast of Peru, he could not understand how it was that it was not exported in larger quantities than at present. Another subject of some importance to the farmer was top-dressing. He should like to know, from some of the practical farmers present, whether any practical benefit arose to the crop from top-dressing. A dressing of nitrate of soda or sulphate of ammonia made the crops look splendidly green; but did any real good accrue!

Mr. W. THURSFIELD said he had found great advantage from top-dressing.

The CHAIRMAN said, it was probably from want of accurate observation, but he perceived no practical benefit to the crop on that part of the field which he had top-dressed; it was much greener, but at harvest he saw no difference. It was very true that they could not lay down any general principles; every person ought to be able by observation to know what was best suited for his own land, for there was scarcely a farm of any extent which did not consist of several kinds of land. Hence the importance of knowing sufficient of general principles to be able to apply one's common sense to particular cases. The value of an institution like that at Cirencester, where the students were made acquainted with the practical application of science, was not sufficiently known and could not be over-estimated. It would be an excellent thing if farmers could send their sons there for a short time, and the knowledge that he would acquire would certainly make him a better farmer. What could be more important than for the farmer to know that coprolite in an undissolved state was useless on the land? It was, however, with some surprise that he heard that one cwt. of guano was equal to a ton of farmyard manure. To put upon land 3 or 4 cwt. of guano was a good dressing—three or four tons of manure would do nothing at all.

Mr. W. THURSFIELD asked what kind of bones were best—those which were calcined, or those in which the glue was left.

Dr. Voelcker said, the value of the bones would be reduced just in proportion as the nitrogen was taken out of them; but inasmuch as the phosphate was made more available the deterioration was more than made up. He would therefore rather have boiled bones.

Mr. Thursfield inquired how it was when he put lime upon a field for barley, after it had been manured by guano and superphosphate for turnips, the crop was not so good in that part of the field as in the portion where he put no lime?

Dr. Voelcker thought the land did not require lime after being well manured with superphosphate. In answer to the Chairman the learned Professor further said, that he did not intend to convey that no ammonia was beneficial to root crops; but generally speaking the plant absorbed enough of atmospheric ammonia, and any large amount applied would do harm. In speaking of coprolites he meant to say that although they were useless to the farmer, they were of the greatest use to the manufacturer. All soils more or less stored up with great care the ammonia—the only exception being loose soils. If, therefore, he had his choice of manures for root crops he should take nothing but phosphates, for in most cases animals were fed on the roots and supplied, with other sources, sufficient ammonia.

The Chairman said, his land would be in a pitiable mess if he were to feed on it, and it would take some time to bring the land into a proper state. Strong land, in his opinion, was the best for turnips—of course he did not mean wet land, because land not drained, with a quantity of sour water upon it, was not conducive to the health of any plant. But those lands which were most favourable for growing swedes and turnips were just those which the farmer could not eat off. He presumed, however, that the Professor meant that if the turnips were taken to the stall, and consumed there, the land ultimately received the manure.

Dr. Voelcker: Certainly; for, to eat off some soil would be to ruin the land. With respect to top-dressing, he had always looked upon this as patch-work, which on a good farm should be dispensed with, although it was very useful now and then. But when the farmer had been prevented prosecuting his regular work, and the land was not in a good state, a top-dressing of nitrate of soda and salt—applied in the spring—was very beneficial. To manure well in rotation however would enable them to dispense in a great measure with top-dressing, although on grass land this was of the utmost utility.

Mr. Thursfield appealed to one or two gentlemen present to whom he had recommended his plan of top-dressing, and they said it had answered.

Rev. H. W. Wayne mentioned that some soils, upon which very poor crops of grain were given, were extremely deficient in alumina. He wished to know whether alumina could be applied to the the land in a concentrated form, or must it be carted in the shape of clay?

Dr. Voelcker answered in the negative.

Rev. H. W. Wayne said there were some springs in that neighbourhood, which contained in solution a large amount of lime; now he should like to know if it would be worth while to mix salt with this water, where it could easily be conveyed over the land, and thus have a deposit of carbonate of soda.

Dr. Voelcker replied that ordinarily there was in water sufficient lime to answer all practical purposes; and the experiment would not in his opinion produce any marked result. In reply to another question the learned professor said, superphosphate by being diluted was not made more fit to apply to plants but inasmuch as it could by being diluted be so much better distributed over the land, immense benefit resulted from using the liquid manure-drill.

Rev H. W. Wayne then in very complimentary terms proposed a vote of thanks to the learned lecturer; and after making some remarks upon the utility of these gatherings, referred to the curious fact that, according to an old Roman writer, the ancient Britons were in the habit of using as manure what they took out of the mines, thus showing that from a very early period our ancestors had been accustomed to enrich the surface of the land.

Mr. Blakeway seconded the proposition with much pleasure. The meeting ought to be much obliged to the talented lecturer for the important knowledge he had communicated, for there was not a farmer present who would not be able to see that he could buy a manure to answer his purpose better than guano at half the cost.

Dr. Voelcker in acknowledging the compliment said, the difference in price was not the only advantage gained; for in an experiment which he had made upon some poor land, he found that guano produced about six tons per acre, while superphosphate produced double—nearly 12 tons.

Mr. Fowler proposed a vote of thanks to Mr. Benson for the able manner in which he had presided over the meeting.

Mr. Evan Davies seconded it. It was often the case that farmers prided themselves upon the amount of money they had expended in top-dressing, without, he was afraid, carefully weighing the results. Last year he top-dressed part of a field; and he must confess that, so far as he could observe, there was no difference in the crop between that which was top-dressed and that which was not. The harvest came upon them rather suddenly, and he was not able to weigh carefully the product of each portion as he intended to do, otherwise he should have been better prepared to give the results than he was at present. The remarks of the Professor upon the subject of soluble phosphates should be carefully considered, for it was now clear that they should secure those manures which had not only phosphate in their composition, but having that valuable ingredient in a soluble form.

The Chairman, after thanking them, asked what protection the farmer had that he was supplied with real phosphates? Clearly but one—to make the manure himself, by buying the bones and dissolving them in acid.

Dr. Voelcker thought it was certainly not the best plan for the farmer to make his own superphosphate. Upon their farm, up to within the last three years, they had manufactured their own superphosphate, but they had now discovered that it was much better to buy it ready manufactured, in addition to the inconvenience of doing so. If the buyer obtained a guarantee that the manure contained a certain quantity of soluble phosphate, he wanted nothing more. This constituent was a distinct chemical substance, and how the manufacturer produced it was nothing to the farmer. The manufacturing of artificial manures was now quite an art; and the superior appliances at the disposal of the large manufacturer rendered it easy for him to produce a good manure at a price not far above what the farmer would have to pay for the crude material. Thus many intelligent manufacturers make a better superphospate than can be made from bones and acids alone.

After a little further conversation, the meeting broke up.

DR. VOELCKER ON THE COMPARATIVE VALUE OF ARTIFICIAL AND FARM-YARD MANURES.

On Tuesday Professor Voelcker delivered a lecture on the above subject, in the Lion Rooms, Shrewsbury. Mr. Joseph Meire, of Berrington, presided.

The attendance was not large.

The Chairman said the subject upon which they were about to hear a very interesting lecture was a very important one to the farmer.

Dr. Voelcker said there had been a good deal of talk about the relative merits of farm-yard manure and artificials. Some would have nothing but the former, while others evidently thought the perfection of good farming was to use an unlimited quantity of artificial manure. Many of the latter gentlemen troubled themselves very little about what they really bought; it sufficed for them to expend a certain amount of money on some description of artificial manure, which might be entirely valueless for their particular purpose. Such, for instance, as the London Economic, the Essence of Guano, and others. Now, farm-yard manure was an excellent thing in its proper place, and so was any other description of manure. Some artificial manures, which were exceedingly valuable, lost their efficacy from being improperly applied, and a great quantity of valuable manure at the present day was wasted on farms for the want of knowledge necessary for its application. Those who had not sufficient intelligence or general knowledge on the subject of plants would be less likely to go wrong if they followed the old-fashioned routine and used farm-yard manure, than by using artificial manure, which at least would be of no use to them. Some knowledge ought to be had of the wants of the different crops that grow in rotation. Those wants could not well be laid before his hearers without a reference to the character or properties of the soil to which they were applied. On the whole, the proper system of manuring required a great deal of rudimentary knowledge, which could not be treated of in a single lecture. He would therefore rather offer a few remarks on the comparative advantages of natural and artificial manure; and each of these possessed peculiarities of their own, which rendered them perfectly well adapted to special purposes. As would be seen on reference to the diagrams, one peculiarity of farm-yard manure was its extreme complexity of character. [The diagram referred to contained the analysis of the component parts of fresh and rotten manure.] It contained both organic and inorganic food, and was applicable to a variety of crops, such as corn, root crops, and grass land; and this, no doubt, was the reason why farm-yard manure was entitled to the name of universal manure. It contained everything required by our cultivated crops. But he did not say that it should always be used indiscriminately. Another peculiarity of farm-yard manure was that it exercised beneficial effect on plants, not only supplying direct food to them, but producing a highly beneficial mechanical effect on the soil, especially on stiff clay land. He was a strong advocate for long dung being applied as soon as possible. In the yard manure one great peculiarity was the large amount of water—in fact, this amounted generally to 66 per cent., and in rotten it amounted to three-fourths of the whole bulk; so that for every ton of active manuring matter, the farmer has to cart three tons of useless materials, even supposing that the remaining ton is composed of nothing else but valuable fertilizing constituents. This would explain why it was that artificial manures were especially adapted for hilly districts and for fields removed a considerable distance from the farm-yard. He did not think that farmers always took a sufficient account of the wear and tear of horses and men in the transit and application of that manure. If the subject were carefully considered, the farmer would think twice befoie he carted a heavy load of farm-yard manure some eight or nine miles from a town, and afterwards applied it to a remote field on the farm; and he would also hesitate before producing farm-yard manure at any expense. Under some circumstances, which every farmer ought to know best for himself, feeding cattle did not pay at all; farmers sometimes made up their minds to feed at a loss, calculating on something for the manure. But it was a very delicate question whether this was the best way of producing manure, or whether it was not better to use the ordinarily-made manure, and apply it in connection with artificial or special manure, the latter term showing that it was adapted for special purposes. If a farm was not in good order, it ought to be brought round by general manure, such as farm-yard manure; but when it was in better condition, to make it go as far as possible, special manure must be resorted to. A peculiarity in artificial manures was that they supplied special fertilising ingredients to the exclusion of some others which were abundant in farm-yard manure. For instance: In the best Peruvian guano there was a high per-centage of ammonia, with about 20 or 25 per cent. of phosphate of lime; and that guano was applied for getting an additional crop of corn. Some other artificial manures—bone-dust, for instance—were valuable on account of their containing phosphate of lime, which was favourable to the production of roots, nothing tending to the rapid development of bulb so much as that. He did not mean that phosphates were of no use to corn crops In some soils they produced a marked effect, and he had that morning recommended a •gentleman to use superphosphate by way of a trial, to keep up his wheat. There had been a good deal of talk about a deficiency of silica in soils, which prevented corn from standing up. It was remarkable that soils peculiarly liable to corn lying down generally contained a high per-centage of silica. From observations that had been made on the subject, he was inclined to think that what had been said about silica must be regarded more as a theory rather than a resting on well-ascertained facts. It had not yet been ascertained how it was that some crops were stronger than others; and until that was found out, it was of no use reasoning upon the matter. Corn become laid down from a variety of reasons. If the land contained a supply of all the elements necessary for the growth of the plant, a dressing of guano produced a coarse wheat, which often became laid down. When wheat became laid down it arose from something in the soil being in too large proportion. Some people had a curious way of estimating the skill of the farmer by the amount of the manure which he put on his land. Some men were content with eight tons of farm-yard manure, while others used as much as twenty tons to the acre. The farmer, however, who tried the larger dose did not often repeat the experiment, for he became convinced that, in farming, what was good in one instance was not good in another. The great advantage of artificial manures was that they contained special fertilising ingredients to the exclusion of other substances, and hence its adaptation to special circumstances. How were these special circumstances to be ascertained? He had no doubt in his own mind that bone dust or superphosphate mixed with farm-yard manure would be of great advantage, as it would supply the element which was very much deficient in farm-yard manure, especially where the manure was produced by young and lean stock, which absorbed all the phosphate of the food; in the manure from fattening animals there was a large proportion of this substance, and hence its great value. Phosphates generally speaking were more suitable for root crops, but it was impossible to lay down general rules; the farmer himself ought to be the best judge, whether in order to obtain a good crop anything else was required. Turnips did not live alone upon phosphate; they required a variety of other substances—lime, soda, potash, and other fertilising matters. It depended upon the farmer to find this out, and no one else. There was a good deal of land in this part of the country which required nothing more, in order to obtain good root crops, than bone in an efficient state of preparation. The learned professor then went on to observe upon the constituent parts of guano and superphosphate, and their application to particular soils and for particular crops. [The substance of this part of his lecture will be found in our report of the Wenlock Farmers' Club]. He illustrated the immense importance of examining the manure we buy, by referring to the following table, which proved that some superphosphate contained four times as much valuable fertilising matters as others:

COMPOSITION OF SUPERPHOSPHATE OF LIME.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Water	19.26	20.53	14.40	22.03	20.37	8.91	10.80	26.89
Organic matter	16.10	14.76	8.93	trace.	25.71	—	4.21	2.08
Soluble phosphate of lime	6.38	10.31	3.60	8.55	5.02	25.70	20.28	14.78
Equal to bone earth..	(9.94)	(16.09)	(5.61)	(13.33)	(7.37)	(40.11)	(31.63)	23.06)
Insoluble bone phosphate	22.16	17.72	6.83	—	1.56	6.68	4.11	5.58
Hydrated sulphate of lime (gypsum)....	25.10	28.39	44.20	24.42	40.16	43.05	46.63	43.60
Burnt gypsum......	—	—	—	40.48	—	12.38	—	—
Alkaline salts	5.16	1.56	2.52	2.41	2 93	96	10.78	1.18
Sand	5.82	6.73	19.50	2.16	4.23	2.32	3.19	5.26
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Per-centage of nitrogen	1.66	.853	1.44	.17	1.11	—	.34	.21
Equal to ammonia	2.01	1.065	1.75	.20	1.42	—	.41	.25

Mr. George Davies, as a farmer, was much obliged for the able and practical lecture which they had just heard. He wished to know if the learned professor could tell him how red clover could be retained on light soils from February until June. He had some years ago conversed with Dr. Pepper on this subject, and was now in communication with Mr. Nesbit, but the latter gentleman had not answered the question he now put.

Dr. **Voelcker** said, this question was a most important one, which it would be most desirable to solve. About four years ago, he paid some attention to what was called "clover-sickness;" and, like most beginners, in two months he fancied he knew something about the matter, and threw out some suggestions, with a view to remedy the evil. Having, however, followed up the question in various operations, and in the laboratory, and after some long correspondence, he had come to the conclusion that, upon the subject of clover-sickness, he knew as much or as little as the man in the moon.

Mr. **Davies** asked if the fermentation of ordinary manure would render chipped bones sufficiently soluble to be of use to the crop?

Dr. **Voelcker** thought it would be quite sufficient; and, after one turning, the bone-dust would disappear. It would, in his opinion, be a very great advantage to use bone-dust in that way.

Mr. **Payne** inquired if the Professor recommended long manure to be ploughed in, or used as a top-dressing?

Dr. **Voelcker** said in very stiff land it would be better to plough it in, as in that way they obtained the full advantage of the manure.

The **Chairman**, in the course of some observations, asked if the plan recommended for keeping up the wheat was by stiffening the straw? If so, superphosphate would be much more likely to do that than ammonia.

The **Professor** said he knew, in some instances, that superphosphate stiffened the soil; but that was a different thing from recommending it for the purpose of stiffening the corn. Ammoniacal manures certainly had a tendency to make corn go down, and should, therefore, be used very carefully.

Mr. **George Davies** then moved, and Mr. **George Watton** seconded, a vote of thanks to the lecturer, which was cordially carried and acknowledged.

A similar compliment was, on the motion of Mr. **Nevett** (Yoreton) accorded to the Chairman, in acknowledging which,

Mr. **Meire** expressed his regret that there was not in the county town a club where farmers could meet and discuss subjects connected with the improvement of the land, and other subjects of the greatest importance to the farmer. The information they had received that day was proof of how much could be gained in this way.

The meeting then separated.

REPORT ON THE CATTLE PLAGUE, STEPPE MURRAIN, OR RINDERPEST.

By James Beart Simonds,

PROFESSOR OF CATTLE PATHOLOGY IN THE ROYAL VETERINARY COLLEGE, LONDON.

Epizootic diseases, and particularly those that have prevailed among cattle and sheep, have in all ages excited much attention, and taxed the pen of the faithful historian, as well as the cultivator of the science of medicine, to record their successive outbreaks and devastating effects. It is not, however, our intention in this report to follow in a succinct manner the account which has been given of these diseases, extending, as it does, from the period of the infliction of "a grievous murrian" of "boils and blains" on the cattle of Egypt, as a Divine punishment to the obdurate Pharaoh for resisting the command to let the Children of Israel go, down to our own times; but to record the result of our investigations into the nature and consequences of the disease which recently seemed to threaten to invade our shores. Whether "the murrain" that fell upon the cattle of the Egyptians has been permitted in an altered or mitigated form to remain as a scourge to succeeding nations is a problem which cannot, we opine, be satisfactorily solved by any supposed resemblance which our present cattle plagues may bear to the one described by the sacred historian. This fearful and miraculous visitation must be regarded as the chief of these scourges, however destructive they may since have been.

In the times of the ancient Greeks and Romans the outbreaks of these diseases were not unfrequent, and numerous records of them are left by Homer, Plutarch, Virgil, and others. Columella, at about the commencement of the Christian era, speaks of them as contagious maladies; and Vegetius, in the fourth century, treats largely of their contagious properties, and recommends that the diseased animals should, "with all diligence and care, be separated from the herd, and put apart by themselves." Fracastorius and Weierus also describe the sad effects of one of these visitations in 810, when it is said that the greater part of the cattle perished throughout the Emperor Charlemagne's dominions.

The first recorded instance, however, which we find of the cattle in England being affected by one of this class of maladies is in 1713-14, at which period an epizootic, that for a few years previously had prevailed in several continental states, suddenly broke out here, and swept off many of our cattle. No account sufficiently explicit upon the nature and progress of the disease has been handed down to us, so that it is difficult to speak with certainty of its true characters, and much more either of its duration or the amount of loss which the country sustained. It appears, however, that the malady possessed many of the features of *Eczema epizootica*, now common among us, and it may possibly have been identical with this disease. The infection seems to have been communicated by the saliva, as it is said that "when this is dropped on the grass, and sound animals are immediately placed on the same pasture, they contract the disorder; and in some bullocks the tongue was inflamed and covered with many red blisters."

This malady was succeeded in 1744 by one of far greater importance, because attended with a far greater fatality. The disease in question early attracted the attention of the Government, who promptly adopted vigorous means of arresting its progress. It is asserted that the malady first appeared in the neighbourhood of London, whence it extended over the length and breadth of the land, destroying hundreds of thousands of cattle, and continuing its devastating effects with almost unmitigated severity down to 1754-5. Its introduction here has been differently accounted for; but it is pretty generally attributed to the importation of two calves from Holland by a farmer residing at Poplar, with a view of improving his breed, and in whose systems the disease was incubated.

Dr. Layard, in his Essay on the disease, says, however, that an opinion prevailed that it was brought over by an English tanner, who had purchased "a parcel of distempered hides in Zealand very cheap, because they were forbidden to be sold there, and should have been buried." It seems, therefore, to have been confidently believed at the time that the disease was an imported one—a circumstance of much practical value, now that we are receiving several hundreds of cattle week by week from the Continent; although, as this Report will hereafter show, our own investigations have proved that no fear need be entertained at present of "the great cattle murrain" visiting our shores. Notwithstanding the deep and painful interest which this disease excited, and the efforts made by the Government of the day to stay its ravages, no correct estimate can be formed of the numbers of cattle which were lost to the country from its duration and extension; but it was ascertained by one of the Commissioners appointed by the Government that in Nottinghamshire alone 40,000 head of cattle perished in six months, and in Cheshire upwards of 30,000 in the same space of time.

By a special Act of Parliament, the King in Council was empowered to issue such orders as were deemed the most effective to arrest the progress of the pest. Instructions were thereupon given,

1st. For the killing of all the infected animals, and burying them entire with the skins on, "slashed from head to tail," that they might not be used for the purpose of the manufacturer.

2nd. For the burning of all the hay and straw used about the animals.

3rd. For the cleaning and fumigating the sheds, &c., and for no sound cattle to be put in them for two months after the removal of the diseased.

4th. For no recovered animal to be allowed to go near others for a month after its convalescence.

5th. For no diseased cattle to be driven to fairs or markets, nor for the flesh to be used as food for dogs, &c.

6th. For no *healthy* cattle to be removed from a farm where the disease had prevailed in less than a month after its disappearance.

And, lastly, orders were issued for the notice of an outbreak to be immediately sent by the farmers to either the constables, churchwardens, overseers, or the special inspectors appointed by the magistrates acting for the parish or district. The Government also undertook to pay forty shillings for every ox, bull, or cow which was killed, and ten shillings for every calf, with a corresponding price for their skins.

Mr. Youatt, in his account of the disease, as published in the work entitled "Cattle," says, "Of the propriety of this bonus for the destruction of infected cattle, there cannot be a doubt, for there were numerous instances in which those who began to kill the sick as soon as the distemper appeared among their cattle, lost very few; but others, who would kill none until their own folly had made them wiser, did not save more than one out of ten."

Many difficulties were thrown in the way of carrying out the instructions, and not a few impositions were practised by some designing persons claiming the award for old and worn-out animals, as well as for those which were suffering from totally different diseases. In this day, now that veterinary surgeons are practising in every part of the country, such frauds would scarcely be attempted; and we believe, in the event of occasion requiring it, that a system of inspection, comparatively inexpensive, might be devised which would effectually prevent any instances of the kind.

It is further recorded that in one year, the third of the existence of the disease, £135,000 was paid out of the Treasury as a recompense for the cattle killed according to the prescribed orders, and that during the same year 80,000 head of cattle were killed, and nearly double that number died from the disease. To meet this alarming state of things, and the difficulties which sprung out of the adoption of the measures of the Government, various other Orders of Council were promulgated, and in the *third* order we find that *no* cattle, fat or lean, would be suffered to pass the Humber and the Trent northward from its date, namely, January 19th, 1747, to the 27th of the following March; the object evidently being to protect the cattle in the northern counties by cutting off all direct communication between them and the infected districts for two months.

Newby, in an appendix to his work on mangel-wurzel, states that the cattle fair at Barnet had its origin in the existence of this disease. "The fair," he says, ' formerly kept at Islington, till the distemper, which raged violently among the cows at that place in 1746, obliged the Welshmen to remove to Barnet, where it has been continued ever since."

Great as were the losses, no reasonable doubt can be entertained that they would have been much augmented had not the Government taken the course it did; and we also fear that the continuance of the disease would have been extended over a far greater number of years than it was. The attempts at cure were not satisfactory, and very little was known of the true nature of the malady even by those members of the medical profession who gave attention to it, for at that time there were no scientifically educated veterinary practitioners. After a careful perusal and analysation of the writings of the different physicians who have treated of the subject, we believe that we are justified in saying that the malady was identical with that which has recently excited so much fear and alarm in the public mind, as being likely to be introduced from the continent.

From the period of a subsidence both in the amount and virulence of this cattle pest in 1754-5 until its final departure a few years afterwards, England appears to have been singularly exempt from epizootic diseases, and to have remained so down to August, 1839, when great anxiety was created by the sudden and almost simultaneous appearance of a "new affection" (although probably of the same nature as that of 1713-14) among the cattle in different parts of the country. The earliest accounts which we received of the outbreak came from Norfolk, and there seems no reason to doubt that it was here that the disease was first observed. Cattle of all ages and under every variety of system of feeding and management became the subjects of the malady, which was recognised by the existence of vesicles upon the upper surface of the tongue, inside the lips, and the dental pad. Vesicles were also formed between the digits, and occasionally upon the teats and udders of the cows. The existence of these vesicles was associated with a discharge of viscid saliva from the mouth, loathing of food, imperfect mastication, suspension of rumination, loss of milk, a tenderness in walking, and general symptoms of febrile action.

The malady was not confined to cattle, but sheep, pigs, and domestic poultry of the gallinaceous tribe were likewise its subjects. By common consent it was designated the cattle epidemic, but has since been scientifically known as *Eczema epizootica*, or popularly as "the mouth and foot disease." It has continued from that time to the present, not proving on the whole a destructive disease to life, but at irregular intervals assuming a severer form than ordinary, more particularly in 1845 and 1852, and leading on these occasions to a great deterioration in the value of the animals affected.

Shortly after the appearance of the eczema, namely, in 1841, pleuro-pneumonia broke out among the cattle, and it, too, has remained down to the present time. It is worthy of a passing remark that neither of these were imported diseases. It was not until several months after pleuro-pneumonia had established itself in the country that an alteration took place in the tariff by which live stock came in free of duty, and up to that time the high rate of duty prevented any importations of foreign cattle or sheep being made. This fact in itself is sufficient to prove that the malady was not imported by foreign cattle; besides which, the parts of the country where it was first observed could not possibly have had any imdiate or direct connection with the ports. Pleuro-pneumonia had no sooner gained a footing, than, following the laws of all epizootics, it quickly spread over a great breadth of country, and continued to devastate our herds with almost unmigitated severity for the first few years. It has since taken on rather an enzootic form, and has prevailed mostly in such localities and places where secondary causes are in full operation to predispose animals to its influence; hence its continuance in the ill-ventilated, over-crowded, and badly-drained cow-sheds of the metropolis and other large towns, and on the "cold retentive soils" and undrained farms in the country, especially such as lie in exposed situations.

Besides the special cause, or rather, perhaps, special combination of causes, which give origin to the enzootic form of pleuro-pneumonia, its appearance in a cattle-shed, or on a farm, is frequently traceable to the introduction of newly-purchased animals, who bring the disease in a latent state with them; and which, on its declaring itself, extends by ordinary infection to those with whom they are located. Infection we hold to be one of the chief causes of the continuance of pleuro-pneumonia for so many years among us, as every diseased animal, by virtue of the exhalations given off from its body, becomes a focus of the malady, and a new source, whence the poison, so to speak, is disseminated. The same fatality which marks the progress of pleuro-pneumonia here, attends it everywhere; and throughout the continent it is looked upon as an incurable disease, and dealt with accordingly. Its great fatality arises from the circumstance that the nature of the changes which take place in the lungs is such as immediately to arrest their function as perfect aerifying organs, and soon to destroy, to a greater or less extent, the integrity of their structure. The true pathology of pleuro-pneumonia is among the *questiones vexatæ* of science. In this report we have not immediately to do with this question, still we may observe that the most eminent professors of veterinary medicine throughout Europe hesitate to declare, as some medical men have done, and others also who have probably given but little thought to the subject, that the changes wrought in the lungs are altogether due to inflammatory action.

In Belgium, in France, and in many parts of Italy, the disease is designated *exudative* pleuro-pneumonia—a name which, while it marks a peculiarity in the disease, implies, at the same time, that it differs somewhat in its results from ordinary inflammation of the lungs and their investing membrane, and which is correctly called pleuro-pneumonia. We have no hesitation in giving it as our opinion that the changes which are *originally* effected in the lung tissue can take place otherwist than by inflammatory action. We observe, as the analogue of these changes, that in the advancement of the disease, the interstitial areolar tissue, contiguous to the more affected parts of the organs, becomes primarily choked with *serous* effusion, which, by its pressure upon the air cells and their rete of capillary vessels, obstructs both the admission of air to the cells, and the circulation of the blood through the vessels, and thus leads to an imperfect decarbonisation of the blood, as well as to far more important changes in the fluid itself. Not only, in many diseases, are serous exudations entirely independent of inflammation, but fibrinous are equally so in the opinion of some of the ablest pathologists of the present day. These deposits may result from the vital force of the vessels being impaired by some depressive influence acting on the nervous system, either generally or locally, as well as by some unexplained or ill-understood alteration taking place in the composition of the blood, by the existence within it of morbific animal or vegetable products. The fibrinous depositions in pleuro-pneumonia succeeds the serous, and are probably due to either an alteration in the relative proportion of the component parts of the blood, or an interference with its vitality, brought about by the presence of the special *materies morbi* of the disease, and which may have entered it in the ordinary manner of infection. The abnormal action which commenced in the parenchyma of the lungs extends towards their investing membrane, when, from the nature of this tissue, as well as from the longer existence of the action itself, an augmented fibrinous exudation takes place upon their surface. We regard, therefore, the implication of the pleura as a characteristic of an advanced stage of the malady, and also of a still farther deterioration of the blood.

Since the appearance of pleuro-pneumonia no other disease of a fatal character and possessing contagious or epizootic properties has shown itself among our cattle; but in 1847 a very fatal malady broke out among the sheep. This affection was recognised as the small-pox of sheep; and it was ascertained in the most conclusive manner that it had been introduced here by some "Merinos," which had been shipped at Tonning, on the coast of Denmark, and also by some others shipped at about the same time at Hamburgh for the supply of the English market, and in whose systems the disease was incubated. From the free commingling of these foreign sheep with our own breeds in the London Cattle Market, and also from the circumstance that many of them were purchased by farmers as "stock sheep," the small-pox was soon spread over a great tract of country, proving destructive to life in numerous instances to the extent of even 90 per cent.

This state of things was met by legislative enactments with view to arrest the progress of the disease, and happily they proved of essential service in so doing. By the expiration of the third year from the outbreak, scarcely an instance of the disease could be met with in any part of the country, and this notwithstanding tens of thousands of animals were, to our own knowledge, affected in the year succeeding its introduction. From the time of its subsidence in 1850 until now, we have been perfectly exempt from cases of small-pox.

This short historical account of epizootic affections of cattle, in this country, brings us down to the present period, and to the especial subject of this report.

It was during the latter part of the past year that the public mind became much excited by frequent and almost continuous reports that a malady of a most fatal description had shown itself among the cattle on the Continent, and that it was rapidly extending towards those countries whence we received our chief importations. In the early part of the present year the subject assumed so much practical importance that the attention of Parliament was directed to it on two or three different occasions. Her Majesty's Government, it was found, had early given instructions for our Consuls abroad to collect all the information they possibly could in their several localities, and transmit the particulars of their inquiries without delay to the Minister of Foreign Affairs. These despatches were from time to time forwarded by Lord Clarendon to the Council of the Royal Agricultural Society, who also had from the beginning taken the liveliest interest in the matter, and who lost no opportunity of placing the latest information before the country through the weekly publication of their proceedings. The official documents, however, in no way tended to allay public apprehensions, but rather, on the contrary, to increase them, as it was distinctly stated that the "murrain" was rapidly making its way westward from the countries where it had been first observed, and that it would ere long be introduced here unless the greatest caution was exercised in regulating our supply of foreign cattle; and that even then it was more than probable the disease would come in, it being said that it could be carried from place to place by skins, hoofs, or horns, or indeed anything which had been exposed to the infection by being brought near to the diseased animals.

Notwithstanding the great amount of information which was supplied by our Consuls, but very little of a satisfactory kind could be obtained with reference to the true pathology of the disease. The Council of the Royal Agricultural Society therefore felt that under such circumstances as these some more decisive step should be taken; and this opinion found a ready response in the other two national Agricultural Societies of Scotland and Ireland. At this juncture a communication was received from the Royal Agricultural Improvement Society of Ireland, suggesting "that it would be desirable for the three agricultural societies of the United Kingdom to join in the common object of despatching abroad a special veterinary inspector, for the purpose of ascertaining the exact nature of the contagious typhus."

At a meeting of the Council, held on the 1st of April, some further communications were read from Mr. Hall Maxwell, C.B., Secretary of the Highland and Agricultural Society of Scotland, and from Captain Croker, Secretary of the Royal Agricultural Improvement Society of Ireland, expressing their willingness to concur with the Royal Agricultural Society in making arrangements for despatching a veterinary inspector to the districts abroad where the cattle murrain was at present raging. The Council thereupon agreed to the following resolution :—

"That it is expedient to send a competent veterinary professor to examine into the nature of the cattle murrain on the Continent. That the Society gladly accepts the co-operation of the Highland and Agricultural Society of Scotland and the Royal Agricultural Improvement Society of Ireland in this step. The Society ventures to recommend that Professor Simonds, of the Royal Veterinary College, be commissioned to this task. That he be empowered to take with him a German veterinary surgeon, established in London, quite competent for the business, and who would smooth the difficulties of the German language. It is supposed that about three weeks would be required for a satisfactory examination. That the Highland and Agricultural Society of Scotland be informed that the Royal Agricultural Improvement Society of Ireland propose to share the expense of this mission with the Royal Agricultural Society of England; and that they be asked to join in the same manner."

It is scarcely necessary to say that the national societies of Scotland and Ireland most readily consented to the proposition contained in this resolution; and on the Government being informed of the step about to be taken, Lord Clarendon kindly forwarded the subjoined letter of introduction to the British Consuls to me, through the Secretary of the Society, accompanied with the following communication :—

"Foreign Office, April 4, 1857.

"Sir,—I am directed by the Earl of Clarendon to acknowledge the receipt of your letter of the 2nd instant, acquainting his Lordship with the intention of the Council of the Royal Agricultural Society of England, in conjunction with the Societies of Scotland and Ireland, to send Professor Simonds to those districts abroad where the disease among cattle is at present raging; and I am to enclose a letter which has been addressed, by Lord Clarendon's direction, to the British consular agents in Northern and Central Europe, instructing them to afford to Professor Simonds all the assistance in their power in carrying out the objects of his mission.

"I am, sir,
"Your most obedient, humble servant,
"James Hudson, Esq." "E. Hammond.

(Enclosure.)

"Foreign Office, April 4, 1857.

"Sir,—I am directed by the Earl of Clarendon to acquaint you that the Council of the Royal Agricultural Society of this country have notified to his lordship their intention, in conjunction with the Agricultural Societies of Scotland and Ireland, to send a veterinary professor to the districts abroad where the disease among cattle is at present raging, and that the Committee have selected Professor Simonds for this service. I am, therefore, to instruct you, in the event of Professor Simonds visiting any part of your district in the course of his mission, to show him every attention, and to afford him all the assistance in your power in carrying out the objects of the societies by whom he has been appointed—I am, sir,

"Your most obedient humble servant,
"E. Hammond

"To the British Consular Agents in Northern
and Central Europe."

The first step, according to my instructions, being to secure the services of a veterinary surgeon familiar with the German language, I at once called on Mr. Wm. Ernes, M.R.C.V.S., a gentleman eminently fitted for the task; and who, besides being a native of Belgium, had had the great advantage of travelling almost throughout Europe, thus becoming practically acquainted with most of the foreign languages. Mr. Ernes had also received an English medical education, and his tastes were in full accordance with the objects of the mission.

Having secured his co-operation, we left London for Belgium on the morning of April 9th, and arrived the same evening at Ghent.

We deemed it expedient to ascertain, with as little delay as possible, the health of the cattle in those countries whence we were receiving our daily supplies, and also the details of the system which prevailed with regard to the cattle trade, together with the particulars relating to the shipment of animals to England. This part of our mission was the more pressing as the recent Order in Council, prohibiting the importation into the United Kingdom of "cattle or of horns, hoofs, or hides, from those territories of Russia, Prussia, or Mecklenburgh-Schwerin, which lie in the Gulf of Finland, or between the Gulf and the city of Lübeck" might be found to require an immediate extension to other countries, or possibly we might ascertain that a relaxation of it could be made without the incurrence of a greater risk of the disease being introduced. We therefore commence our inquiries in

BELGIUM.

Our investigations here fully confirmed the statement made by Lord Howard de Walden, her Majesty's Ambassador at Brussels, in his despatch to Lord Clarendon, dated March 20th, 1857, that this country was perfectly free from the rinderpest. We found that eczema epizootica prevailed to some extent, but not in a serious form, and that pleuro-pneumonia also existed in several parts of the kingdom. Rinderpest had not shown itself to an extent to create much solicitude since the Seven Year's War, during which time it destroyed vast numbers of cattle. From 1813 to 1815 some cases occurred in the district between Namur and Luxemberg, and which are said to have depended upon the passage of the Austrian army into France. The route taken by the army was south of the Belgian frontier, and near to the places in question; and it appears that along its whole course the disease was manifested to a greater or less extent on either side of the military road. It is also said that the cattle belonging to the Prussian army being healthy, no disease followed its course through the country, and thus a great part of Belgium escaped the pest; the measures of sanitary police confining it chiefly to the neighbourhood of Namur, and the districts in which it had manifested itself.

We refrain from commenting on these facts in this place, as hereafter we shall have to call attention to the freedom of continental states in general from the disease, unless infected cattle, or such as have been exposed to the contagious influence of the malady, are introduced therein.

At Ghent we visited a cattle fair which was held the day after our arrival, and had thus an opportunity of observing the general state and condition of animals brought from all parts of the kingdom, and which proved to be most satisfactory. From the cattle-dealers we learned that no difficulties existed in the way of the passage of cattle to or fro over the frontier, so long as they are healthy, but that restrictions would be rigidly enforced on the breaking out of a contagious disease. Lord Howard de Walden writes that "no law exists under which diseased cattle can be excluded at the *frontier;* a project of law, with a view to such sanitary precaution, was presented to the Chambers two years ago, but was rejected; and therefore the only resource lies in the activity of the burgomasters in frontier localities, by enforcing the general regulations in regard to animals while within the range of their jurisdiction."

Pleuro-pneumonia has prevailed rather in a sporadic than an epizootic form for the last two years, and an equal number of cases are said to have occurred in places where the feeding and general management of the animals are unexceptionable, as in those where the opposite state of things obtains, but that, under the latter-named circumstances, the disease has assumed a more fatal character. All animals which are supposed to be affected by this disease have to be reported by the proprietors, and if, on examination by the Governmental veterinary surgeon, they are found to be the subjects of it, then an order is given for them to be killed. The skin, horns, and other integumental parts are used, but the flesh is buried as a rule, in accordance with the regulation of the Government, who pay a proportionate amount of the value of the animal, and generally to the extent of one-third.

It appears, however, that this regulation is sometimes evaded, and that the carcases of such animals occasionally find their way into the meat market, but no instance of injury done to persons eating such flesh is known to have occurred. Many animals also are not officially reported, as the proprietor either sells them for slaughtering or has them killed unknown to the authorities. Should this, however, become known, the animal is seized, and disposed of as the Government sees fit, and a fine is also inflicted on the offender. Upon the whole, the laws of the sanitary police are so strictly enforced, that in the event of the rinderpest extending into Belgium, it seems scarcely possible for animals which *had even been exposed* to its infection to be exported from the country.

At Antwerp, we ascertained that the chief exports of animals to England from thence are calves, and that the major part of the cows and oxen which are fatted for the market are sent into France, where at this time a better price is obtained for them than in England. The calves are purchased of the farmers in different parts of Belgium by commissioned agents, who collect them together for shipment from Antwerp, but some of the oxen come direct from Holland. The proportionate amount of oxen to calves which are exported is shown by a return furnished by MM. Vandenbergh for the year 1856. The MM. Vandenbergh are the largest shippers of cattle to England; and although a few animals are sent over by other companies, they are in about the same proportion. The return shows that 2,020 calves were forwarded here in the year, but only 10 oxen.

HOLLAND.

As this country sends our principal supply of foreign cattle and sheep, it became the more important to ascertain their freedom, or otherwise, from contagious diseases. With the exception of pleuro-pneumonia and eczema, no other affection prevails among the cattle. Rinderpest has had no existence for upwards of forty years, and is unknown even to the veterinary profession, except by name. The parts of the country most affected with pleuro-pneumonia at this time are North Holland and Friesland.

By a statistical return from forty-three villages in North Holland and Friesland, it is shown that only eight of them have been comparatively free from pleuro-pneumonia, and in these but very few cattle are kept. In the villages where the disease has prevailed, about a fifth part only of the cattle-owners have escaped upon the whole, but in many every proprietor has had his herd affected. In the first quarter of the present year the official returns show a total loss of 3,655 head of cattle, of which 1,502 died, and 2,153 were killed by order of the authorities, which gives an average loss of about 281 per week.

We are not surprised at the great extent of these losses, judging from what we saw of the secondary causes of epizootics in operation in the vicinity of Rotterdam. The cattle are often crowded into houses so thickly, that to pass between them is almost an impossibility. The form and size of the building also will frequently allow of a passage only to be made by a person along its centre, where the heads of the animals nearly meet over their feeding troughs, while the height of it is generally insufficient to stand upright in. No windows exist in many of these sheds, nor any other inlet for light and air, except the door. The heat is almost suffocating, and the stench abominable. In such unwholesome and pest-breeding places as these the cattle, often to the extent of forty or fifty in a shed, are kept for weeks together to be fatted for the market, by being fed chiefly on the wash and grains which come from the distilleries.

The cattle which are sent from Friesland are shipped at Harlingen direct for England, and the numbers put on board there are fully six times greater than at Amsterdam. Friesland is one of the great cattle districts of Holland, and supplies not only the English market with many animals, but other countries likewise. She therefore receives no imports, nor does it appear that any of the vessels conveying cattle from the ports of the Elbe or the Weser, or from any part of the coast of Holstein, ever touch at the Dutch ports, so that a contagious malady like rinderpest, existing in Holstein or in the countries watered by those rivers, would have to make its entrance by way of the land into Holland.

No restrictions are put upon the cattle trade with reference to the bringing of animals over the frontier, but all importations of the kind would be immediately prohibited on the appearance of the disease in question in any neighbouring states. The prices obtained for cattle in the English market are not viewed as being sufficiently remunerative just now by the Dutch feeders, and hence the diminished numbers sent here. When the contrary state of things prevailed, many animals were purchased in Prussia by the dealers, and forwarded to the different ports of Holland for exportation; and not a few, it is said, came even from Switzerland down the Rhine for the same purpose. These facts show that it is possible for a disease of a malignant kind, which is incubated in the system of an animal for ten days or a fortnight, to be introduced into England from other countries *via* Holland: and, also, how necessary it is that we should be acquainted with what is passing on the continent with regard to diseases in general as affecting cattle, and particularly if belonging to the class which forms the subject of this report.

The continuance of a well-ordered and rigid system of inspection of imported animals on our part will, however do much to protect us, and that not merely by its leading to the detection of diseased animals on their arrival, but by the effect which it will have upon the export trade of foreign countries. Proof of this is given by the circumstance that last year, when it became known that our Customs' inspectors had received orders to be particularly strict in the examinations of cattle, the General Steam Navigation Company of Rotterdam, unwilling to take the responsibility of the probable rejection of animals committed to their care, appointed a veterinary surgeon to examine them when put on board their boats. This company brings by far the largest proportion of cattle to England, and although this precautionary measure was not adopted by other shipping companies, they nevertheless declared their intention of having recourse to it, and only refrained from so doing, because of the great diminution which took place in the number of the animals which were shipped. The system of examination was kept in force for about three months, when also, and from the same cause, the General Steam Navigation Company discontinued it. The returns of these examinations, together with the results were regularly transmitted to the British Consul. Should the prices again rise in England to an extent which would, in the opinion of the cattle feeders, justify them in sending us more animals, then there cannot be a doubt of the re-establishment of this system of inspection.

No duty is chargeable on animals imported into Holland, but an *export* one has to be paid, and which amounts in English money to about the following rate per head, namely, oxen, 10d., calves 2d., sheep 2d., lambs 1d., pigs 1d., with an additional duty of thirteen *per cent.* on the gross sum.

Although Holland rears immense numbers of cattle, she, for her great export trade in these animals, becomes an importing country for hides, receiving her chief supply of these from Java and Buenos Ayres, with some England, but none from Russia, so that all fear of our introduction of contagious diseases through the means of skins may cease, in so far as Holland is concerned.

Our investigations led us to visit the cattle feeders, and among others we saw Mynheer A. Poot, who resides within a few miles of Rotterdam. M. Poot ships upon an average 600 animals a-year. He informed us that no disease had prevailed in his sheds since February last, prior to which time he had several cases of pleuro-pneumonia. He appeared to be an entire stranger to any other contagious disease, and said that, in the event of an affection like rinderpest breaking out among his stock, a *cordon* would be immediately placed around the farm by the *local* authorities, and that he should be compelled to slaughter the diseased animals and bury them with their skins on in quick lime. In his opinion it would be an impossibility to export any portion of their carcases to England, even if attempts were made to do so, in consequence of the strictness with which the police sanitary regulations are carried out. He adduced as an instance that on the first breaking out of pleuro-pneumonia in 1829, and before experience had shown that the flesh could safely be used for food, he and others had to kill the affected cattle and bury them entire, with a view to prevent injury being done to the people, as well as to limit the spread of the malady.

On the question of our Government ordering all imported animals to be slaughtered on their arrival in the docks, and their carcases sent to the meat market, M. Poot considered that such a step would be tantamount to the stopping of the importations entirely. The boats very rarely, if indeed at any time, are freighted with cattle all belonging to the same person: the cargo is therefore mostly comprised of animals the property of several individuals, and identity of each particular animal, which is necessary for the purposes of trade, could scarcely be made under such circumstances; besides, he said, a necessity would be created for an immediate sale of the meat to the injury of the interests of the persons sending the animals. He was equally opposed to the establishment of a quarantine, and was of opinion that it could never be carried into practice, and England continue to receive full supplies of foreign cattle.

The system at present adopted is for various feeders to consign their cattle to salesmen in the London market, who, as in the home trade, charge a commission on the sales they effect. As no animals are brought into Rotterdam coastways for re-shipment, all consequently have to pass through the town to reach the vessels, so that they are thus subjected to the general inspection of the local authorities, regulations existing to prevent diseased animals from entering into this and the other towns of Holland. Besides the security thus afforded it is clearly not in accordance with the interests of the exporters to put diseased cattle on board, as it is impossible for them to bear up against the fatigue of a sea-voyage, or to be on their arrival here in a fit state to pass the scrutiny of our Customs inspectors.

The cattle which are fatted either for the Dutch markets or for exportation are purchased at the different fairs and markets in the country, and are for the most part reared in Friesland and Guelderland, scarcely any being brought in from other countries

Upon the whole, notwithstanding the dangers we have pointed out, the system which prevails generally with regard to the cattle trade, and the additional regulations which would be enforced did necessity arise, appear to offer a fair amount of security against the introduction of a new cattle pest from Holland.

WESTPHALIA AND HANOVER.

These countries are entirely free from Rinderpest, and have been so for upwards of forty years; and, besides which, very little disease of any kind was found to be prevalent among the cattle. The laws which are enforced with regard to contagious diseases, are analogous to those which are generally adopted upon the Continent, but differ a little in some of their details.

Pleuro-pneumonia was said by the late M. Hausmann, Professor of the Veterinary School, to have been first observed in Hanover as early as 1807. This disease has existed with some few intervals, and with more or less severity, down to the present day. Of late years the animals attacked have been so few as not to create any great solicitude on the part of the Government. Precautionary measures are, however, adopted on the frontier with regard to cattle coming from Holland, which are made to undergo a quarantine, and none are allowed to enter from Holstein, unless they are certified to be in a state of perfect health.

Veterinary surgeons are bound to give notice of all cases of contagious disease which they may meet with in their practice, and proprietors also are required to report the appearance of pleuro-pneumonia or allied affections among their cattle. No animal, although seemingly in perfect health, if it has been living with others affected with pleuro-pneumonia, can be pastured or driven on roads so as to come within two hundred yards of other cattle; nor can the owner dispose of any of his herd under such circumstances until it is certified by the department veterinary surgeon that all the animals are perfectly free from the disease. The period of time which is allowed to elapse after the passing away of the malady and the selling of the cattle is left to the discretion of the veterinary surgeon. A proprietor can place his animals under medical treatment if he sees fit, or he is at liberty to slaughter them and send them to the meat market. The flesh of those affected with pleuro-pneumonia, even in its advanced stages, is not unfrequently sold, as in England, by the inferior class of butchers.

A regulation exists with regard to the disease of glanders, which, although it does not belong to the special object of this report, may, nevertheless, be mentioned. Horses affected with this malady are not only prevented being sold or exposed for sale, but the owner is compelled to have them killed; and he is not allowed, under the pain of a heavy penalty, to sell any other horse out of his establishment, or even to place any one of them in stables belonging to other persons, for six months after the death of the affected animal.

M. Hausmann, Veterinary Surgeon to his Majesty the King of Hanover, informed us that a conviction had very recently taken place under this law, where a carrier was heavily fined for putting his horses, which had been with a glandered animal, into a stable at a public inn in the town of Hanover, on the occasion of his coming to the place on the market day.

HAMBURG.

This, as the chief port of the Elbe, receives a considerable number of cattle from the surrounding districts for exportation to England, and large quantities of hides are also sent from hence. Some diminution in the amount of cattle which of late has been shipped at Hamburg has taken place, and from the same cause which is assigned by the exporters from Holland, namely, that the price obtained in the English markets is not sufficiently remunerative when compared with that which can be procured at home.

The cattle come chiefly from the distillers, sugar refiners, and farmers in the town and territory of Hamburg, and the adjoining duchies of Holstein and Lauenburg. They are usually sent first to the market at Hamburg, and if not sold are exported to England. An inspection of them is regularly made in the market by a duly appointed veterinary surgeon; besides which they are prevented entering the town unless found to be in a healthy state. These regulations afford us a certain amount of security against the importation of diseased animals from this port. The system of inspection has been in operation from the commencement of the recent outbreak of pleuro-pneumonia in Holstein; but it has been particularly observed since September, 1856, when the following proclamation was made by the Senator of the Marshlands of the territory of Hamburg—

PROCLAMATION.

It having been communicated to the Senator for the district of the Marshlands that in several parts of the Duchy of Holstein a pulmonary disease has again broken out among the cattle; in order to prevent the introduction of this dangerous malady, it is hereby ordered that for the present no cattle can be brought into the district of the Marshlands from the duchies of Holstein and Lauenburg without a certificate from the proper local authorities, stating that, at the places from whence the same may come, no infectious disease prevails among the cattle, and this under a penalty of 50 thalers for every case of contravention.

The whole of the bailiffs and subordinates are hereby required particularly to attend to this order, and obtain observance of the same, and denounce to the authorities of the Marshlands all who may disobey or attempt to disobey the same.

(Signed) ARNING, DR.
Senator for the Marshlands.

Hamburg, 19th September, 1856.

No cattle intended for the English market are brought into Hamburg by the ships from Tonning or the other ports on the coast of Denmark, but they go direct to England; nor are many conveyed there for this purpose by means of the navigation of the Elbe from Central Germany. "The Order in Council," at the time our visit in April, did not appear to be understood by the exporters of cattle as to the intention of the Government with regard to this port; and they refrained at first from shipping cattle, although Hamburgh was not named in the prohibition, for fear lest on their arrival in England they should be seized by the Commissioners of Customs.

We were informed by Colonel Hodges, Consul-General at Hamburg, that a similar doubt existed with regard to hides, and, further, that the order would be inoperative for good, presuming that the seeds of a contagious disease could be conveyed by these articles of commerce so long as Hamburg, as the port of the Elbe, and Bremen, as the port of the Weser, were left open, as large quantities of these commodities come down those rivers. The hides are collected from out of various countries, and it is impossible to trace them to their original source. The merchants of Hamburg, however, continued to export hides, first making a declaration before the consul that they did not come from Lubeck or any of the Baltic ports. The consul upon this certified that such declaration had been made, and thus left our Commissioners of Customs to deal with the question as they might see fit. Should the necessity unfortunately arise to prohibit the importation of cattle, hides, hoofs, &c., from fear of introducing a contagious disease, such as the rinderpest, then not only must Bremen and Hamburg be named in the order, but Tonning also, as the port of the Eider, as this place has direct water communication with the port of Kiel on the Baltic, from which place hides, hoofs, &c., can readily be conveyed.

Little fear, however, need be entertained of the introduction of the disease from Denmark by means of any cattle which she might receive from the Baltic ports. The difficulties in the way of a *direct* trade of this kind are too great for it to be carried on with facility or advantage. Such cattle would have to make the port of Kiel, and be then disembarked, in order to be placed on the vessels navigating the canal which connects Kiel with the Eider, and on reaching Tonning be again re-embarked on vessels bound for England.

DENMARK, SCHLESWIG, AND HOLSTEIN.

In September last it was officially communicated to the Government by Vice-Consul Blackwell of Lubeck, that "the *steppe murrain of Russia had made its way into Holstein*, having passed through Poland, Prussia, and Mecklenburg." We ascertained, however, that this disease had no existence in this part of Europe since the occasion of its last general outbreak in 1813. It is also recorded that up to that time the affection had not prevailed in the duchies since 1774 to 1781, when 150,000 head of cattle are said to have perished.

Pleuro-pneumonia is rife in Holstein, particularly in the neighbourhood of Altona, where an active cattle trade is carried on. The malady is said originally to have appeared here in 1842, or nearly about the same time it was first observed in England. At the commencement of 1843, Herr Rottger, district veterinary surgeon of Altona, received orders from the Danish Government to watch the progress of the disease. No active means to limit its extension were, however, had recourse to until 1845, when the Government sent Professor Witt of Copenhagen, to investigate the matter. Professor Witt and Herr Rottger, with a surgeon and the Government veterinary surgeon of Hamburg, formed a sanitary commission of inquiry. The commission came to the conclusion that the disease was highly contagious, and recommended the Government to adopt the most stringent measures of prevention. These consist in chief of—

a. Sequestration of the places where the disease is found to exist.

b. The immediate slaughter of the infected animals.

c. The killing of the whole herd upon the occurrence of fresh cases.

d. The burial of the diseased cattle with their skins on, cut in such a manner as to prevent their being surreptitiously disposed of, and the sprinkling the body over with chloride of lime.

The indemnity consists in the Government paying two-thirds of the value of the diseased animals, and the full value of the healthy, the loss to the treasury being partly provided for by the Government selling by public auction the carcases of the animals which are free from disease.

For the carrying out of these regulations, it is ordered among other things that every proprietor of cattle shall, upon the outbreak of a disease which seems to possess some unusual features, give notice to the district veterinary surgeon, or be subjected to a fine varying from fifty to a hundred thalers. The veterinary surgeon has to report the result of his examination to the police, and if it should prove that the malady is a contagious one, then the regulations are strictly enforced. The animals are valued on the part of the Government, and branded on the horns for the purpose of identity. Should no other cases occur after the diseased animals are killed, then a proprietor is prevented selling any of those which had been exposed to the contagion, and which bear the Government stamp, in a less period of time than six months, and only then with a certificate from the veterinary surgeon that they are free from disease.

The adoption of these severe measures led, it is believed, to the nearly total extinction of pleuro pneumonia in two or three years. In 1847, however, it again prevailed in Holstein, also commencing, it is said, in the neighbourhood of Altona. In 1849 and 1851 other outbreaks occurred, the disease extending on the latter occasion into Schleswig and Denmark proper, but was quickly suppressed by the severity with which the law was executed.

The outbreak from which the country is at present suffering took place in the spring of 1856. It is attributed to the circumstance of two gentlemen of Hamburg purchasing in Hungary 180 oxen, and sending them to graze on the islands and marshlands of the Elbe. The disease manifested itself in these animals, and from them it was communicated to some cows which were sent daily from the town of Hamburg to graze in the same pastures, and was thus spread over the territory and the adjacent portions of Holstein. This called for the re-adoption of the preventive measures previously alluded to, and which are still in operation in the Duchies, but modified to some considerable extent in the town and territory of Hamburg.

The almost simultaneous appearance of pleuro-pneumonia in Mecklenburg, which is said to have depended on the introduction of some cattle from Bavaria, together with its existence in several of the German States, led the Government to issue the following order with reference to the importation of cattle into Holstein and Lauenburg.

Copenhagen, June 18, 1856.

PROCLAMATION for the DUCHIES of HOLSTEIN and LAUENBURG, in reference to the IMPORTATION of HORNED CATTLE from abroad.

Whereas, according to official information, the pulmonary epidemic has recently shown itself again in horned cattle in several German States, the importation of horned cattle from abroad will not, until further notice, be permitted into the duchies of Holstein and Lauenburg, unless satisfactory certificates, issued by authority, be handed in at the same time, stating the place from whence the cattle have been brought, and that in such place no signs of the pulmonary epidemic have appeared for more than six months, the cattle being therein described as accurately as possible.

The above is hereby made known for the information and guidance of those who receive it; and at the same time the police authorities are especially directed to see the strict observance of the above order.

Royal Ministerial Department for the Duchies of Holstein and Lauenburg, 9th June, 1856.

(Signed) V. SCHEELE.
G. HARBOU.

Pleuro-pneumonia, however, continued to prevail in Holstein, despite all measures precautionary or otherwise, which were had recourse to, and this led the Minister to issue new regulations during last year, to stay if possible its further progress. It was thereupon ordered that "*all estates* (farms) *in which cases of pulmonary disease have occurred within the last six months, are to be closed, and no removal of cattle from such estates is to be permitted. The cattle are to remain as much as possible in the same stalls, and only to be removed to the pasture grounds of the owners, which are to be fenced round to the exclusion of all other cattle, as it is deemed necessary to remove cattle from their infected stalls to purer air.*"

In July, 1856, SCHLESWIG placed the importations into her territory from Holstein under restrictions; but as these also proved to be insufficient, the Minister of this Duchy, in March of the present year, forbade the importations entirely.

In August, 1856, Denmark, by the Minister of the Interior, likewise ordered that no cattle would be permitted to enter the kingdom from Holstein, unless they were accompanied by a certificate of a veterinary surgeon, stating that they were in good health when exported, and also by the certificate of a magistrate, that the district from which they came was free from disease. And in September following proclamation was made to a similar effect by "the Senator of the District of the Marshlands of Hamburg," a copy of which has been given above.

This succinct history of the proceedings of foreign governments enables us to trace to their probable origin those restrictive laws which have created so great solicitude in England. We could hardly have supposed that such severe measures would have had the support of scientific men, and more especially in their exclusive application to a disease, whether contagious or not, the antecedents of whose history show that it often passes from country to country as an ordinary epizootic affection.

Without wishing to animadvert on the opinions of others, we hold that an equal amount of good would attend measures far less stringent; and, if this be so, then a positive injury is inflicted on the country where they are enacted. Take, as one illustration, the quantity of food which is lost to the people by the burying of animals in whose system the malady has made but little progress. We are exceedingly jealous lest any observation of ours should be supposed to give encouragement to the sale of diseased meat; but, after fifteen years' experience of pleuro-pneumonia in this country, and of the sale of the carcases of animals, the subject of it, we do not hesitate to state that the flesh is fitted for food in the early stage of the affection.

The surprise in the continuance of the system of killing and burying bovine animals becomes the greater when we see it adopted in a country where the sale of horseflesh, as an article of food, is both legalized and encouraged by the Government. In Altona we passed by the shop of one of these horse-butchers, and saw exposed for sale part of the hind-quarters, and sundry pieces of flesh of a horse, and also the liver and kidneys of the animal. We were tempted to walk in, when we were informed by the proprietor that there were four other establishments of the same kind in the town, but that his was "the original one." He said that so ready a sale was found for the meat that it was with great difficulty he could procure horses enough for his customers. The price ranged from about 2d. to 3d. per lb. English money, and it appeared that the meat was often bought by persons who could not be properly said to belong to the lower classes. We were invited to see the establishment, and visited the slaughter-house and stable. In the former, besides more meat, was hanging the lower part of the fore leg, with the foot of the animal last slaughtered, which had been put aside for the inspection of the police; and in the latter were standing two aged and worn-out horses waiting their turn to be led to the stake.

These butcheries are licensed by the Government, and are under the supervision of the police. Notice has to be given before a horse can be killed, when the veterinary surgeon of the department attends and examines the animal, and, if found to be free from constitutional disease, notwithstanding it may be incapacitated for work from lameness or other defect, he certifies to that effect, and for the sake of identity brands the animal on its hoof. Within a given time the animal must be killed, and its leg and foot produced for the inspection and satisfaction of the police.

SWEDEN AND NORWAY.

We find by a perusal of official documents which have been placed at our disposal, that the fear of the introduction of pleuro-pneumonia from Holstein led the government of Sweden to interdict the importation of cattle from that duchy in August, 1856, unless accompanied by satisfactory certificates of health. The importation also of cattle from England and Scotland into Sweden was prohibited in the same month. These precautionary measures on the part of Sweden were quickly followed by the promulgation of similar ones by the Government of Norway, being in each case evidently founded on the belief that contagion is the chief, if not the only cause of the spread of pleuro-pneumonia.

LUBECK.

From the circumstance that her Majesty's Government, by "the Order in Council" of April 2nd, saw fit to prohibit the importation into England "of cattle, horns, hoofs, raw or wet hides or skins of cattle, which shall come from, or shall have been at any place within the territories of the free city of Lübeck," as well as other places named in the said order, it was to be expected that the so-called "steppe murrain" (rinderpest) would be found to be prevailing among the cattle at Lübeck. We were informed, however, and immediately on our arrival, that no such disease existed; and ample opportunities were afforded us of subsequently confirming the correctness of this statement. Indeed, rinderpest has never shown itself in the territory since 1813-15, when by the movement of troops throughout Europe it prevailed rather extensively here and also in most countries of the continent.

The precautionary measures which were taken in the spring of 1856, by the Senate of Lübeck, *had especial reference to pleuro-pneumonia*, which disease had somewhat suddenly made its appearance in the adjoining Duchies of Mecklenburg-Schwerin and Mecklenburg-Strelitz. Some doubt, however, was felt in this country as to whether the "steppe murrain" had not found its way thence from Prussia; and this was considerably added to by the official reports of Mr. J. A. Blackwell, who up to the beginning of the present year was British Vice-Consul at Lübeck.

In two despatches dated respectively May 17th and 30th, 1856, Mr. Blackwell informed her Majesty's Government, through the Consul-General at Hamburg, that a contagious pulmonary disease or murrain had broken out among the cattle in Mecklenburgh; and after giving the particulars of the precautionary measures adopted by the Lübeck authorities to prevent its entrance into their territories, he states that he had consulted several of the best German authors on the contagious maladies of cattle, and found that they made a distinction between "rinderpest and pulmonary murrain;" but he adds, "*both are equally contagious and almost equally fatal, and in a sanitary point of view may in fact be regarded as identical.*"

Mr. Blackwell next gives, in the despatch of May 30th, an epitome of the works in question, and under the heading of the STEPPE MURRAIN, he says that it has been calculated that during the last century alone this murrain carried off 28,000,000 head of cattle in Germany; and in the whole of Europe, including Russia, but exclusive of Siberia and Tartary, upwards of 200,000,000;" and that "*although the disease which has broken out among the horned cattle in Mecklenburg seems to be regarded as the pulmonary murrain' pleuro-pneumonia, "it may perhaps be the real steppe murrain, which is now raging in Poland to a fearful extent, notwithstanding the stringent measures that have been adopted by the Russian Government for putting a stop to it.*"

In a despatch dated September 17th, the same gentleman reports that *the murrain* had extended to Holstein, and that in consequence of this the regulations of the Lübeck Government were enforced with regard to that duchy, as well as Mecklenburg. He concludes his communication by observing that, "*as this highly contagious murrain has spread from the steppes of South Russia, through Poland, Prussia, and Mecklenburg to Holstein, to a district from which the English market is supplied with cattle, I must beg leave to call the attention of her Majesty's*

Government to my Report of its origin, progress, treatment, symptoms, &c., transmitted on the 30th of May last."

These statements could not fail to add to the alarm which was originally felt in this country; and when it is considered that for several months afterwards scarcely a week elapsed without intelligence reaching us that "the cattle murrain" was spreading, the surprise becomes the greater rather than otherwise, that some measures of a preventive nature were not earlier adopted by her Majesty's Government. It is true that the reports from other British consuls did not fully bear out Mr. Blackwell's statements, but still nothing satisfactory could be learned of the true nature of the malady; and up to the time of the three National Agricultural Societies determining on sending a commission to investigate the subject, the English public were left in a state of uncertainty and doubt.

In October, 1856, we find that the restrictions against the entrance of cattle into Lübeck from Mecklenburg were removed, as the disease appeared to have ceased there; but they were again enforced in February following, as the malady had reappeared, and on our arrival they were still in full operation.

The regulations which had been enforced by the Senate to guard against the introduction of contagious diseases are as follows. They have been established for several years, and are only modified from time to time, according to the places in which such diseases are known to prevail.

"1. Every owner of cattle is required, in case any disease should break out among the same, which leaves no doubt of its contagious nature, to separate the diseased from the other cattle.

"*a.* The special symptoms of *lungenseuche* (pleuro-pneumonia) are a husky cough, which is increased, particularly after the cattle have been watered or moved about, less inclination for food, indifference as to chewing the cud, dulness of the hair, and its rough appearance in particular places, and fever after these symptoms have continued for some time.

"2. On the appearance of this disease, or even in cases when it is suspected to exist, the owners of cattle are required, under a penalty of a fine of 20 dollars (about £3 10s.) to give immediate notice to the chief of the police, or to the bailiff, at Travemunde, who will take the necessary steps to arrest the progress of the disease.

"3. The bringing in of cattle into the Lübeck territory from the Grand Duchies of Mecklenburg-Schwerin and Mecklenburg-Strelitz shall only be permitted when the cattle are accompanied by satisfactory certificates of their being free from disease.

"4. All veterinary surgeons are directed, in case this disease should break out within the Lübeck territory, to adopt the necessary sanitary precautions according to the instructions of the police. The directions of the veterinary surgeons are implicitly to be obeyed under penalty of heavy fines and imprisonment.

"5. Finally, all police-officers, bailiffs, and gens-d'armes are hereby directed to give notice to the respective police-offices in case any horned cattle should be attacked with the pulmonary disease, or even in cases where it is suspected to exist.

"Given at Lübeck in the Assembly of the Senate, this 14th day of May, 1856. (Signed)

"C. TH. OVERBECK, Dr., Secretary."

Besides these measures of precaution, special instructions are issued for the guidance of veterinary surgeons when the disease has entered the territory. These are—

"1. That, on the appearance of pleuro-pneumonia, immediate notice should be given to the police authorities.

"2. That the affected cattle are to be forthwith separated from the healthy, and removed to a distance. If they are put to grass, the meadows must be divided by good fences, and must be at the least five hundred paces distant from any in which other cattle are kept.

"3. That the persons who tend cattle are to be directed to note carefully the feeding and ruminating of the animals, and, on the slightest indication of disturbed health, to have them professionally examined.

"4. That an inspector, duly conversant with disease, is to be specially appointed to attend the sick cattle; and that without his permission no animal is to be returned to those which are healthy.

"5. That all animals which die are to be buried five feet deep, and covered over with compact earth; that the burial-places are to be not less distant than eight hundred paces from any road or paths travelled by cattle, and that they are afterwards to be surrounded by a strong fence or a ditch.

"6. That the diseased cattle are only to be driven in particular roads; that the stables in which they were placed when attacked are to be carefully cleaned, and the manure to be covered over with earth.

"7. That none but medical officers are to make *post-mortem* examinations, and these only by permission of the police authorities; and that no part of the carcase is to be taken away or used, with the exception of the skin.

"8. That for the removal of the dead animals special vehicles are to be provided; and these are to be kept in proper places, and not used for any other purpose. Persons attending upon the sick cattle, or coming in contact with them or with the dead, are not to go near healthy animals, and are to take care that all tools or utensils they may have used are properly cleaned.

"9. That no manure or fodder is to be sold from off an infected farm.

"10. That no animal, however slightly affected, is to be killed for food. Great vigilance must be used in respect to this order.

"11. That, after the disappearance of the disease from a commune or farm for a period of *eight* weeks, it is to be considered as being free from the malady; but that for *four* weeks longer the proprietor is not to sell any cattle or other forbidden things from off the place."

It does not appear that any law is in operation to prevent the importation into the territory from Russia or other countries, of skins, horns, hoofs, or tallow; but we were informed by M. Tollhausen, the French Consul, and who was acting also *pro tem.* as British Vice-Consul, that the official returns show that from 6,000 to 8,000 only of dry hides annually enter the port of Lübeck from Russia, for transit inland; while from Mecklenburg and the surrounding countries 80,000 skins are received. These are mostly either salted or fresh, and as such are too heavy for transit to a distance, besides being otherwise unfitted for such a purpose: they are, therefore, further prepared and dried in Lübeck, and then sent onwards to Belgium, Rhenish Prussia, &c., and up the Rhine even as far as Switzerland.

No exports of cattle take place from Lübeck by means of the shipping, nor are any imported in this manner from the Baltic or elsewhere, the supply which is needed being sent over the frontier from the surrounding duchies. Besides this, we could not ascertain that any cattle have ever been shipped for England from any of the Baltic ports. The difficulties attending such a voyage, and the time it would occupy, are sufficient barriers against a trade of this description being carried on, even if no facilities existed for the transit of cattle inland.

Young stock, however, to the amount, it is said, of 50,000 a year, pass through the territory of Lübeck, from Holstein into Mecklenburg, for the supply of the dairies and farms.

These facts cannot fail to be of importance for legislation, if hereafter it should unfortunately be the case that the rinderpest should extend thus far westward, and in a direction from which foreign cattle are shipped for England.

MECKLENBURG-SCHWERIN AND MECKLENBURG-STRELITZ.

It was from these Duchies that some of the earliest accounts reached England respecting "the murrain," the appearance of which promptly led the Senate of Lubeck to interdict the passage of cattle into its territory, unless accompanied with a certificate of their being in a perfect state of health, and created also much anxiety as to whether the malady might not soon extend to our own country. The alarm, however, seems to have arisen out of the circumstance that pleuro-pneumonia, which had occasionally of late years affected the cattle in Mecklenburg, in common with other continental states, showed itself somewhat suddenly in March, 1856, at the village of Great Görnon, near to Steinberg. Its outbreak is attributed to the introduction of some cattle from Bavaria; and it appears that the "court cattle which were in the same stable" were subsequently attacked. After the death of several, the remainder of the animals were killed, and buried entire.

This summary proceeding appears to have arrested the disease in that particular village; but cases are said to have occurred in other parts of the Duchies. The interdict which was laid on the estate of Great Görnon concerning the "export, import, and transit of cattle, immediately on the outbreak of the disease," was not, however, removed until Oct. 1st of the same year, after which time free intercourse was allowed.

On this fact being officially communicated to the authorities at Lübeck, and also that the whole of Mecklenburg was free from the disease, the Senate removed the restrictions which had been placed in the way of cattle entering their territory; but, as has been observed in that part of this report which specially refers to Lübeck, these were again enforced in February of the present year, in consequence of the re-appearance of the disease in the Duchies of Mecklenburg.

On the 24th of December, 1856, the Commissioners of our Customs published an order with regard to a more rigid examination by the Inspectors of Foreign Cattle, "with special reference to a contagious disease called 'murrain,' which has recently broken out amongst the horned cattle of Mecklenburg." Count Bulow, Minister to the Grand Duke of Mecklenburg-Schwerin, complained of this order to Lord Blomfield, her Majesty's Ambassador to the Court of Prussia, and requested that the attention of the Home Government might be directed to it; and Lord Blomfield thereupon sent a despatch to the Earl of Clarendon, to the following effect:

"Berlin, January 23, 1857.

"My Lord,—I have the honour to inclose to your lordship herewith a copy of a communication which I have received from Count Bulow, Minister of his Royal Highness the Grand Duke of Mecklenburg-Schwerin, requesting me to draw the attention of her Majesty's Government to the injurious effects which the publication of the Custom House order, published in London the 24th December, 1856, respecting the importation of cattle, alleged to be diseased, from the Mecklenburg States, is likely to have on the commerce of the country. Count Bulow states that 'the cattle murrain," alluded to in this order as now existing in Mecklenburg, has only manifested itself twice, for a short period, during the years 1855, 1856; and that in each case measures of such a stringent nature were taken as effectually arrested the spreading of the disease, insomuch that since the 1st of October last all the measures of precaution that were in force for its prevention have been suspended by the official order to this effect, a copy of which Count Bulow has transmitted to me, and which, in original and translation, I have the honour to forward herewith to your lordship. "I have, &c.,

(Signed) "BLOMFIELD."

From this and all the additional information which we have collected, it would appear that there was very little cause for danger to be apprehended, and none in so far as our country was concerned, from the state of the health of the cattle of Mecklenburg, the so-called "murrain" being only the affection known as pleuro-pneumonia.

SAXONY.

This kingdom is perfectly free from rinderpest, and has been so for many years. Scarcely any apprehensions are entertained that the disease would reach the country, even if it were to encroach very much more upon the Prussian frontiers of Russia and Poland, or prevail to a far greater extent than it has recently done in Silesia, as the severity with which the preventive laws of those countries is carried out is viewed as affording all the security which is required.

Eczema epizootica has been somewhat rife of late, and many cases are still to be met with. Pleuro-pneumonia has only existed in a sporadic form in Saxony and Central Germany, and has, therefore, not excited so much of the public attention here as elsewhere. The laws in force with reference to cattle diseases are almost identical with those which have already been made mention of in this report.

The investigations in Saxony completed our inspection of the chief course of the river Elbe, and showed that all the countries through which it flows were entirely free from the rinderpest, a result equally as satisfactory as that which had previously been ascertained with reference to the Weser.

PRUSSIA.

Finding that the rinderpest had no existence in the countries we had already passed through, we proceeded to Berlin with a view of going to Konigsburg,and thence into Courland, as, according to the information we were at present in possession of, it was here that the malady was prevailing to some considerable extent.

Arriving at Berlin, we first called on the professors of the Veterinary School, who, by virtue of their appointments under Government, are always put in possession of the latest information with regard to the existence and extent of contagious diseases among domesticated animals. From them we learned that the entire district we had proposed to visit was now perfectly free from the pest, and that, if it existed anywhere in Prussia, it would probably be found in the neighbourhood of Breslau, in the province of Silesia. They further also informed us that there was but little chance of our being able to study the nature and symptons of the pest in any part of the Prussian dominions, from the summary proceedings which are invariably had recourse to, for its immediate extirpation, and that for the purpose of seeing the malady in its different stages, we should have to go into Austro-Poland, or some other part of the Austrian empire, where the laws are somewhat less stringent, and not so rigorously enforced as in Prussia. We ascertained also that in all probability, in the event of our succeeding in obtaining an entrance within the Prussian military cordon, we should not be allowed to repass it in a less period than three weeks, and even then we should most likely have to leave the clothes we had worn behind us, besides having ourselves to undergo a disinfecting process.

Under these circumstances we sought an interview with Lord Augustus Loftus, her Majesty's *Chargé d'Affaires*, in the absence of Lord Blomfield, minister at Berlin, with a view of obtaining from the Government of Prussia the latest particulars with regard to the location of the malady, and that amount of assistance and protection which we needed for the fulfilment of our mission.

This interview was at once granted, and we were most courteously received by his lordship, who manifested the liveliest interest in the question, and also expressed his willingness to do all he could in furtherance of our object. His lordship explained at some length his views as to the absolute necessity of keeping up of a strict *surveillance* over all articles of commerce which were likely to carry the *materies morbi* of the cattle pest, and of the danger which would be incurred in the event of its extension, by allowing the importations to go on from the great ports of the Weser and the Elbe; facts which have already been alluded to in the former part of this report. Lord Loftus also dwelt on the amount of danger which might probably arise from the free importation of bones from Russia and the Baltic ports, and instanced a case where an outbreak of the malady was believed to have depended on the conveyance of the bones of an animal dying with the affection into a stable in which other cattle were placed.

His lordship requested that I would write to him, stating the object of our inquiry and the requirements we needed from the Government. He also promised that he would put himself in immediate communication with Baron Manteuffel, and would likewise write to his Excellency Sir Hamilton Seymour, her Majesty's ambassador at the Court of Vienna, to procure for us letters of introduction and recommendation to the authorities in the Cracow division of Galicia, in the event of its being found necessary to go thus far to complete our inquiry.

A letter containing his lordship's suggestions was thereupon forwarded to him, and to this I had the honour of receiving the following reply with the subjoined enclosure:—

" Berlin, April 28, 1857.

" Sir,—I beg to acknowledge the receipt of your letter of this date.

" I enclose to you herewith copy of a letter I have addressed to Baron Manteuffel, requesting H. E. to give you a letter of recommendation for the proper authorities at Breslau; and I shall not fail to forward to you without delay H. E.'s reply.

" I shall likewise request Sir H. Seymour to procure for you a similar introduction to the authorities at Cracow, and shall further beg him to forward the reply to your address, " Poste restante à Cracovie.' " I have, &c.,

" Augustus Loftus.

'Professor Simonds, Hotel Victoria, Berlin."

(*Enclosure.*)

" Berlin, ce 23 Avril, 1857.

" Monsieur le Baron,—Le Professor Simonds, Membre du Collége Royal Vétérinaire à Londres, vient d'arriver à Berlin, étant chargé d'étudier sur les lieux la nature et le traitement de l'épizootie qui s'est manifestés en plusieurs endroits sur la frontière de la Prusse et de l'Autriche. Se rendant Samedi prochain dans ce bût à Breslau, et désirant acquérir la protection et l'assistance des autorités Prussiennes, il s'est addressé à moi, me priant de solliciter de V. E. une lettre de recommandation pour S. E. Monsieur le Président Supérieur de la Province de Silésie.

" J'ai donc eu recours à l'obligéance si souvent éprouvée de V. E., en la priant de vouloir bien recommander le Professeur Simonds soit à la haute protection du Président Supérieur ou à la bienveillance des autorités compétentes de cette province.

" Je dois avertir V. E. que le Professeur compte quitter Berlin pour cette province Samedi prochain.

" Je profite de cette occasion, &c.,

" (Signé) Augustus Loftus.

" A. S. E. la Baron de Manteuffel."

His Excellency Baron Manteuffel most readily complied with the request thus made, and in the evening of the same day Lord Loftus wrote as follows:—

" Berlin, April 28, 1857.

" Sir,—Baron Manteuffel has told me that he will forward, or cause to be forwarded, though M. de Raumer, a letter of recommendation for you to the Upper President of the province of Silesia, so that on your arrival at Breslau you may at once announce yourselves to Baron Schleinitz.

" I enclose herewith the despatch for Mr. Ward, her Majesty's Consul-General at Leipzic, to whom I likewise enclose for you a letter of introduction. I am, Sir, &c.

" Augustus Loftus.

" Professor Simonds, Hotel Victoria."

Being now furnished with all the necessary letters of recommendation, we made our way as quickly as possible into Silesia; and arriving at Breslau, at once reported ourselves to Baron Schleinitz, by whom we were also most courteously received, and who had already prepared for our use a written account of the progress which the disease had made in the spring of the present year in his province.

The Baron met us by somewhat facetiously remarking, " that fortunately for Prussia, but perhaps very unfortunately for us, who had travelled so far to study the nature of rinderpest, it had no existence just now in Silesia." He traced, however, upon the map the different places where it had recently prevailed near to the Polish frontier, and which he himself had visited. He likewise related several remarkable instances of the highly infectious nature of the disease, and of its conveyance from place to place by *indirect* means of contagion. The following is a translation of the report alluded to:—

" *Report of the Disease which prevailed among the Horned Cattle in the Province of Silesia during the months of March and April,* 1857.

" The rinderpest, which in the present year has visited the province of Silesia, has, with one exception, in which the precise manner that the infection was carried to the premises could not be satisfactorily ascertained, been clearly traced to the introduction of two herds of cattle from Galicia, of the Podolian or Hungarian breed, numbering respectively 44 and 37. These beasts were purchased by different landowners, and were brought to their several estates in an apparently healthy condition. Some of the animals have remained in health, as, for example, those which were taken to L. Guttentag, in the circle of Lublinitz, and to Blassiowitz, in the circle of Tost-Gleiwitz, but others of them became the subjects of the disease.

" THE GOVERNMENT DISTRICTS OF BRESLAU.

" Eight oxen were brought to the domain or estate of Furstenau, circle of Neumarkt, and were put into a stable with some other cattle. In a few days the eight oxen fell ill, and, on the disease being recognized as the rinderpest, they were immediately slaughtered. They had, however, already infected the others, and, on several becoming diseased, the whole herd, consisting of twenty-one animals, was likewise slaughtered. On the same estate there were *eighty* cows, but these were living in other sheds, and did not come in contact with the diseased animals; and, moreover in the same village there are upwards of *one hundred cattle-owners*, but the whole of the cattle were preserved by the summary measures had recourse to. The sanitary *cordon* drawn around the estate was removed twelve days since; three weeks having elapsed since the last case, and everything used about the animals being disinfected.

" THE GOVERNMENT DISTRICT OF OPPELN.

" 1. Twenty oxen were brought to the estate of Schweieben, in the circle of Tost Gleiwitz, and on their arrival they were distributed to the different stations (farms) of the estate. The disease also broke out among these animals, and, as they sickened, they were removed to a station where only sheep were kept, and here slaughtered. A military cordon was also drawn around the place. Notwithstanding this precaution, the disease spread thus—

" *a. In Schweieben* one ox was attacked, and he, with another with which he was standing, was immediately killed. The further progress of the disease was at once arrested, although there were 120 head of other cattle on the estate, and in the village also about a hundred cattle-owners.

" *b. Station Radum.*—An ox which showed premonitory symptoms was immediately killed, together with another that he was standing next to, and no other cases have occurred.

" *c. Station Wischnitz.*—The appearance of the rinderpest at this station is very remarkable. It appears that either four or six of the Podolian oxen were sent here, and remained for a few days. These animals gave no evidence of being affected; but *twenty* days after their departure, one animal of a herd of

19, that they had been placed with, fell ill with the disease, and the whole were forthwith slaughtered.

"2. At Ponischowits.—Twenty Podolian oxen came here on the same occasion, and they within a few days gave indications of being affected. Like the others, also, they had been put with other cattle, 49 in number. On the occurrence of the outbreak the whole were killed, so that not a single head of cattle was left on the estate. The place was likewise surrounded by a military cordon; but while the disease was going on, a carpenter's apprentice, employed on the estate, escaped the vigilance of the guards, and went to his father's house, which was distant about two thousand paces. While there he repaired a manger in his father's cow-shed, and also changed the clothes he had worn at Ponischowits. The rinderpest in consequence of this broke out among his father's cattle. The whole were thereupon killed, and a military *cordon* drawn around the premises. It is now ten days since the animals were slaughtered.

"3. At Slupsho, four of the Podolian oxen sent here were attacked. They were likewise slaughtered, and the further progress of the disease arrested. The *cordon* has been raised here four weeks; the place having been previously disinfected.

"4. At Zawaiz, in the circle of Beuthen, at a totally isolated farm, a case of sudden death occurred to an ox, which the surgeon reported as happening from rinderpest; but there is considerable doubt as to this opinion being correct.

"5. At Wohlau, in the circle of Pless, close to the frontier of Galicia, and into which no cattle had been imported, three cases of the disease occurred, and all at peasants'. These animals had come in contact with nine others, and all were consequently killed and a military cordon established. In this particular instance it was impossible to trace the cause of the introduction of the disease.

"These are all the cases of rinderpest which have recently occurred in the provinces of Silesia, and at the present time not a single suspicious case exists, owing to the means which the Government has adopted to arrest its course. No fear need be entertained that the disease will extend from Prussia to the neighbouring countries.

"(Signed) Baron Schleinitz.
"Privy Councillor to his Majesty the King of Prussia,
and Upper President of the province of Silesia.
"Breslau, April 27th, 1857."

It will not be necessary to comment on this Report in this place, and more particularly as we shall have hereafter to adduce some remarkable proofs of the contagious nature of the rinderpest. It is right, however, as several parts of Prussia have experienced during the last two years different outbreaks of the malady, and as its extension in this kingdom especially is an object of much practical importance, as thereby a greater risk is incurred of its reaching those countries which are in direct communication with our ports, that as complete a history of these recent visitations should be here given as we have been able to collect.

The Recent Outbreak of the Rinderpest in Eastern Europe.

Throughout the late war, the movements of the Russian troops necessarily called for the transit of large numbers of cattle to those places which the army successively occupied; and it appears more than probable that the wide diffusion of the "steppe murrain" which has occurred within the last three years has depended entirely upon this cause.

The ordinary traffic in cattle leads, it is true, to the annual removal of large herds from the steppes; and hence the outbreaks of the rinderpest in those countries which are otherwise free from it can often be traced to the animals which find their way from the various fairs and markets. No cause, however, is so potent in the spread of the disease as the outbreak of a Russian war; and consequently, whenever circumstances have required the passage of her troops over the frontier, the pest has manifested itself in a far more extensive form.

Thus it is recorded that, "during the Russo-Turkish war in 1827 and 1828, the Russian cattle which were sent for the supply of the army carried the murrain with them, and that it destroyed no less than 30,000 head of cattle in Hungary, 12,000 in Galicia, and 9,000 in Moravia."

Again in 1831, 1832, and 1833, in consequence of the Polish insurrection, the disease committed great ravages in that country, causing considerable distress. At this period it also crossed the Prussian frontier, in the department of Bromberg, and, although quickly exterminated, swept away nearly 1,000 head of cattle.

In 1849-50 the malady again prevailed to a very great extent in Hungary, its introduction being due, according to the official report of M.M. Renault and Imlin, commissioners appointed by the French Government to inquire into the subject, to the passage of the Russian troops from Wallachia by way of Transylvania.

Very shortly also after the army of Russia was sent to occupy the Principalities, rumours of the cattle plague became current; and we find that as early as 1854 the disease had made considerable progress both in Volhynia and Podolia. From that period nearly down to the present the malady gradually extended itself, until it reached most of the countries in Eastern Europe, and some parts even of Asia Minor. From the Principalities it can be traced in a northerly and westerly direction into Moravia, Galicia, Poland, Prussia, Lithuania, &c.; easterly into Bessarabia, Southern Russia, and the Crimea; as also into Turkey, and to the southern shore of the Black Sea.

We have not been able to arrive at any correct estimate of the immense losses these several countries sustained in consequence of this visitation; but it has been officialy reported that no less than 26,442 head of cattle were destroyed in the Austrian dominions in the year 1856. And Consul-General Mansfield, in a despatch from Warsaw, states that from May 9th, 1856, to the date of his report, March 29th, 1857, twenty thousand beasts had been sacrificed in Poland alone. It has likewise been said that the French army lost in Samsoun 8,000 beasts out of 17,500 in the space of nine months, and that we lost during the same time 4,000 out of 10,000 from the pest—facts which may help to convey an idea of the hundreds of thousands which were swept away.

Mr. Radcliffe, M.R.C.S., who lately held a commission in the Ottoman army, reports that, while he was stationed at Sinope, the murrain was developed towards the termination of the spring or early part of the summer of 1855, and that in the month of June it reached its acme. "Scattered cases," he adds, "occurred, however, from time to time until November, when, about the second or third week of the month, the disease broke out again with great fierceness, spread rapidly among the cattle in the depôt and in the town, reached a second acme about the termination of the month, declined during December, and ceased altogether in January, 1856."

Among many others also, Mr. Walton Mayer, V.S. to the "Royal Engineer Field Equipment," who was, during the war, attached to the Land Transport Corps, speaks of the existence of the disease in several parts of Turkey, and in the immediate neighbourhood of Constantinople, in the summer of 1855. Early in the same year, in consequence of a considerable part of both Austrian and Russian Poland having become the seat of the disease, much apprehension was shown lest it should cross the Prussian frontier. To prevent this the Prussian Government took the precaution of sending detachments of troops to all the points of egress below Thorn, with a view of cutting off the communication with the infected localities.

M. V. Schleinitz, President of the department of Bromberg, in the province of Posen, in his official report, says, that "it was in the month of March, 1855, that we were obliged to order the frontier to be closed, which was first effected in pursuance of the directions in section 2 of the law of 1836. In October of the same year we were under the necessity, in consequence of the threatening approach of danger, of putting into force the severer directions of section 3 respecting the closing of the frontier; and when, at the end of that month, intelligence, though not officially confirmed, arrived here regarding the progress of the murrain, we caused the Polish district bordering upon our department to be thoroughly investigated by the veterinary surgeon of our department within a distance of three miles from the boundary of our territory."

"It being then ascertained that the disease was only 2½ miles from our frontier, we determined, at the beginning of November, to close the same still more strictly, according to section 4 of the said law. At the same time we ordered the district commissaries of police to inform the mayors of the different places of the impending calamity, who were not only instructed to exhort the inhabitants of their districts to use the greatest precaution, but also to give immediate notice, per express, to the Councillor of administration of the district of every suspicious case of disease breaking out among the cattle."

"As a further warning and instruction to the public, we caused copies of the circular which was issued by the chief magistrate of our province, under the date of 28th January, 1845, to be printed and distributed, to which we annexed a description of the symptoms of the disease, and caused the same to be distributed as a supplement to our official paper (*Gazette*). Besides this we prohibited the attendance of persons at the weekly markets of the towns lying nearest to the threatened boundary with those species of cattle, as well as with other things likely to convey infection, and which the law of 1833 specially enumerates; we likewise ordered establishments to be erected for personal purification in the villages wherein the frontier custom-office is established; stationed gendarmes in the villages on our side of the boundary situated nearest the infected Polish districts, and charged the district commissaries in the immediate neighbourhood, under pain of dismissal from office, with the execution of the preventive measures in case the contagion should break out in our territory. We further empowered the Councillors of the Administration of the district to order the district veterinary surgeons to inspect the villages and places on the boundary as often as necessity required, and to watch over the state of the health of the cattle there."

Notwithstanding these precautions were rigorously adopted, the disease crossed the Prussian frontier; and in the latter part of November, 1855, it manifested itself in the circle of Inowraclaw, and shortly afterwards in the circle of Gnesen, near the town of Posen. The official report states, that on this occurrence "general measures were taken for closing the boundaries of the places infected, and special ones for the infected farm-yards, by means of sentries posted under the superintendence of gendarmes; quarantine stables were established, superintendents and cattle inspectors appointed, and these persons provided with written instructions and bound by oath to their observance; all trade in cattle was forbidden within a circuit of three miles, all dogs chained up, and every proprietor of cattle within a circuit of two miles from the infected place was bound upon pain of incurring the penalty of sec. 309 of the Criminal Law, to give immediate notice even of the least symptom of disease among his cattle, to the mayor of the place, who had forthwith to inform the Councillor of the Administration of the district by an express messenger, of such cases of disease, provided they did not proceed from exterior injuries."

"These measures for prevention and cutting off intercourse were in no instance abandoned before the expiration of the fourth week; and the carcases of the cattle that had died of the pest, or had been killed in consequence of its appearance in infected districts, no matter whether diseased or healthy, were always, after their skins had been cut into pieces on all parts of the body, buried in pits from six to eight feet deep, each carcase being previously covered with unslackened lime."

At the first the chief execution of these preventive means on the several farms was intrusted to civilians, but very early in the progress of the malady the military was employed. The disease presently began to subside, but despite every precaution occasional cases occurred, so that the department of Bromberg was not entirely freed from it until the beginning of 1856.

The *cordon*, however, on the frontier of Poland was not raised; but on a decline of the disease in that country a removal of the impediments which had been placed in the way of trade was gladly permitted. Individuals who could satisfy the officers of the urgency of their business—which, however, must not be in connection with cattle or cattle offal—were, by reason of a certificate from the Councillor of Administration of the district, allowed to cross the frontier, through the custom offices, into Poland. Upon similar conditions foot passengers, who must, however, be furnished with only the most necessary requirements, were likewise permitted to pass into the department of Bromberg from Poland. Nevertheless all individuals crossing the frontier, together with their effects, were required to be disinfected in the establishments erected for that purpose at the boundary custom place, under the superintendence of a gendarme.

Persons travelling post were likewise subject to the same regulations, and spun goods were not allowed to enter.

Early in 1856—namely, in the month of April—the disease also broke out in the department of Breslau, in the province of Silesia. For the particulars of this occurrence we are indebted to Lord Loftus, to whom they were officially communicated by the Prussian Government. The report states that "for forty years the department had been entirely free from the rinderpest, but that the disease had existed therein during the 'War of Independence.'" "All investigations have failed," it says, "to show the precise manner in which the outbreak occurred; but it appears that the disease came from the circle of Schrimm, in the district of Posen. The means of its extension from the circle of Schrimm are the more obscure, because those persons who might have been the cause of the conveyance of the infection are interested in not giving correct information. A knowledge of the existence of the pest only reached the authorities at Breslau after three different circles were more or less affected, which circumstance arose from the want of experience of the district veterinary surgeons, none having had an opportunity of previously seeing the disease. Subsequently, also, about a month elapsed before correct reports were obtained from the commissioners who were specially appointed for the investigation, arising from the great distances they had to travel, and the difficulties which were in the way of their making *post-mortem* examinations."

"The disease lasted for seven months; and its continuance so long depended in part on the footing it obtained while the investigations were going on, as during this time many animals were inadvertently exposed to the infection; and consequently they had the malady incubated in their systems when the preventive measures were enforced. Another cause of this long duration of the malady is to be found in the difficulties which were experienced in the adoption of the sanitary laws, and the want of zeal on the part of the public in giving effect to them."

In October, the disease declined in the different circles, and was nearly extirpated; but, about the middle of November, it reappeared in the villages of Braunau and Seitsch, which doubtless depended on a second communication being established between them and some of the still infected farms. The following table shows the number of the places affected, together with the quantity of cattle kept, and the result of the outbreak:

Circle.	Number of Infected Villages,	Number of Infected Farms.	Number of Cattle kept in the Villages.	Died.	Killed.		Total Loss.
					Diseased	Healthy.	
Wohlau .	5	7	823	5	8	10	23
Steinau..	4	35	487	97	78	107	282
Guhrau..	15	77	4218	151	423	187	761
	24	119	5528	253	509	304	1066

The report states, in conclusion, that, "considering the extent of the circles, and the number of cattle kept in them, together with the length of time which elapsed before a correct diagnosis was arrived at, the loss is but a trifling one, and especially when it is compared with the thousands of animals which are sacrificed to the disease in other countries."

Subsequently to the extirpation of the pest from this part of Silesia, in November, 1856, the province continued free until the month of March of the present year, when, as has been previously explained by the official report which we have previously inserted on the authority of Baron Schleinitz, some villages lying near to the frontier of Galicia were affected by "the introduction of two herds of cattle from that country." It thus appears that Silesia has experienced two separate outbreaks, the first during the year 1856, and the second in 1857.

By the extension of the disease northward Lithuania and Courland became affected, the pest showing itself in the latter-named province in the autumn of 1856, and continuing until January, 1857, with an estimated loss of 2000 head of cattle. Throughout the entire year of 1856, in consequence of the steady progress of the disease in Russian Poland, the importation of cattle, skins, bones, hair, &c., was strictly prohibited all along the Russian frontier of Eastern Prussia.

On the occurrence of cases at Kowno and Tauroggen, and particularly at Lansayen and Georgenburg, places near to the frontier in the circle of Tilset, more severe measures were adopted; the driving of cattle along the right bank of the Niemen was interdicted, and all traffic between the countries was suspended. No persons having to do with cattle were allowed to cross; or if so, they had to undergo a quarantine, while mail passengers were fumigated at the borders. In the month of August the authorities in the circle of Gumbinen were ordered to stop all the cattle and horse fairs which were to be held in the succeeding months of September and October.

By the strictest enforcement of these sanatary regulations this division of Prussia was preserved until the spring of 1857, when the malady crossed the frontier, and showed itself in the villages of Bassnitzkehmen and Meldiglaucken on the 2nd and 3rd of April. The disease, however, was at once arrested by the establishment of a military cordon, and by the wholesale slaughter of the animals affected, as also of those suspected to be diseased, and the burial of their carcasses in quicklime in holes 8 feet deep.

It was this immediate arrestation of the pest in this district which induced us, as has been previously observed, to alter our route and to go on to Silesia, instead of Eastern Prussia and Courland, with a view of studying the nature of the malady.

From the preceding particulars it appears, then, that since the latter part of 1855 the disease has entered the kingdom of Prussia from adjacent countries in three of its different provinces, namely, in November 1855, in the circle of Inowraclaw, province of Posen; in March, 1857, in the districts of Tost-Gleiwitz and Lubinitz, province of Silesia; and in the following April in the villages of Bassnitzkehmen and Meldiglaucken, province of East Prussia; besides having prevailed for several months in 1856 in other parts of Silesia, coming there from Posen.

GALICIA.

Leaving Silesia, we proceeded to Cracow, taking with us letters of recommendation from Baron Schleinitz to Count Clam Martinitz, President of this division of Galicia. Waiting our arrival also, we found at the *poste-restante* a similar communication from G. H. Seymour, her Majesty's Ambassador at Vienna, which was accompanied by the subjoined letter:—

"Vienna, April 27, 1856.

"Sir,—In compliance with the request made in your behalf by her Majesty's Legation at Berlin, I at once applied to the Minister of the Interior for the facilities of which you stand in need, and have now the pleasure of forwarding to you the enclosed letter of introduction for Count Clam Martinitz, President of the Government of Cracow, who has already received instructions by telegraph to afford you every possible assistance in the prosecution of the inquiries with which you have been entrusted by the Agricultural Societies of England, Scotland, and Ireland, under the sanction of her Majesty's Government.

"I am, &c.,

"J. B. Simonds, Esq." "G. H. SEYMOUR.

On calling at the official residence of Count Clam Martinitz, we were immediately admitted to an audience, when, on presenting our letters of recommendation, his Excellency expressed his entire concurrence in the object of our mission, and his readiness to afford us every facility in his power in its accomplishment. He explained that, in his division of Galicia, the malady was fast declining, but in the circle of Neu Sandec, and also of Jaslo, a few cases would probably be met with. He likewise expressed an opinion that we might have to go as far as Lemberg to satisfactorily study the disease, as in that division of the country it prevailed to a much greater extent. In the event of this being found necessary, he kindly promised to furnish us with all necessary letters of introduction to the Governor of the Lemberg division of Galicia, as well as to the local authorities of the places we should visit in his own governmental division, and also copies of the official documents relating to the progress of the disease, and the instructions issued by the commissioners of the sanitary laws.

In accordance with this arrangement, in the evening of the same day we had the honour to receive the following letter, with its several enclosures, two of which we here insert, namely, the statistical return of the progress of the disease, and the notice which regulates the proceedings of the sanitary commission.

"30th April, 1857.

"Sir,—I have the honour, according to my promise, to send you a letter for the Kreishauptman of Jaslo, and another for Count Gotachowski at Lemberg. I think it proper to join one more addressed to the Kreishauptman of Tarnow (the place where you are to leave the railroad), in case you should need any assistance relating to your further journey. I send you also the papers we have spoken of. "I am, &c.,

"J. B. Simonds, Esq." "CLAM MARTINITZ.

(Enclosure No. 1.)

GENERAL REPORT of the PROGRESS of the RINDERPEST in the GOVERNMENT of CRACOW, from the 1st to the 15th of April, 1857.—Cracow, 23rd April, 1857.

Circle.	Names of Villages.	Date of the Outbreak.	No. of Cattle.	No. of infected Farms.	Sick on 1st April, 1857.	Increase to Apr. 15.	Total No. of Sick.	Recovered.	Died.	Killed.	Remained April 15.	Total from the time of the outbreak of the Disease.			
												At-tacked.	Re-covered	Died.	Killed.
Sandec.	Starawiés	March 21	940	1	—	—	—	—	—	—	—	26	—	4	22
	Lipowe	„ 21	182	1	—	—	—	—	—	—	—	7	—	7	—
	Rovtoka	April 11	100	1	—	2	2	—	1	—	1	2	—	1	—
	Lossosina-dolnah	March 20	395	1	3	12	15	—	—	15	—	72	3	53	16
	Wronica	„ 20	262	2	4	17	21	—	10	11	—	53	1	41	11
	Passyn	„ 25	218	1	—	10	10	—	4	6	—	12	—	4	8
	Alt Sandec	„ 31	729	1	—	—	—	—	—	—	—	6	—	2	4
	Tasowsko	„ 20	257	1	—	—	—	—	—	—	—	3	—	1	2
	Zabrzes	„ 20	453	1	2	1	3	1	—	—	2	14	3	8	1
	Kamienica	„ 30	438	1	—	—	—	—	—	—	—	44	—	32	12
	Sscsawnica	„ 21	490	2	1	—	1	—	—	—	1	34	4	25	4
	Tylka	„ 20	78	1	—	—	—	—	—	—	—	11	—	10	1
	Florynka	„ 17	190	2	2	3	5	—	4	—	1	21	2	18	—
	Banica	„ 22	50	1	1	—	1	1	—	—	—	9	1	8	—
	Kruslowa wyz.	April 6	425	1	2	—	2	—	—	2	—	4	—	2	2
	Ptaszkowa	„ 3	800	4	10	6	16	—	2	14	—	16	—	2	14
	Bialah-nisnia	March 30	258	2	10	—	10	—	—	10	—	11	—	1	10
	Bialawyznia	April 4	586	1	—	1	1	—	—	1	—	1	—	—	1
	Total of 18 villages	—	6,841	26	35	52	87	2	21	59	5	346	14	212	115
Jaslo.	Trabarna	March 15	67	1	—	4	4	—	3	—	1	9	—	8	—
	Pielgrzynka	„ 16	362	3	4	2	6	—	4	—	2	27	—	25	—
	Czekay	„ 14	103	1	—	—	—	—	—	—	—	6	—	3	3
	Mylarz	„ 23	198	1	—	—	—	—	—	—	—	1	—	1	—
	Foluszo	„ 16	225	1	—	—	—	—	—	—	—	6	—	1	5
	Swialkowa	„ 30	472	1	2	2	4	—	—	3	1	17	2	11	3
	Taworze	„ 27	210	1	—	6	6	—	5	—	1	6	—	5	—
	Turaszuwka	„ 15	350	1	—	—	—	—	—	—	—	7	—	7	—
	Suchodol	„ 30	558	1	1	2	3	—	1	—	2	4	—	2	—
	Szymbak	„ 19	866	1	—	—	—	—	—	—	—	9	—	1	8
	Ropa	„ 29	1,382	1	—	7	7	—	2	5	—	8	—	3	5
	Niecznajowa	„ 28	237	1	1	2	3	—	1	2	—	3	—	1	2
	Grab	„ 15	486	1	1	—	1	1	—	—	—	16	1	12	3
	Zydowskie	„ 19	237	1	5	7	12	—	8	3	1	15	—	11	3
	Lipinki	„ 28	875	1	—	—	—	—	—	—	—	4	—	2	2
	Total of 15 villages	—	6,633	17	14	32	46	1	24	13	8	138	3	93	34
Tarnow.	Dabrówka	March 21	56	1	—	—	—	—	—	—	—	16	—	12	4
	Siemiechów	„ 28	75	1	7	—	7	5	2	—	—	42	6	36	—
	Total of 2 villages.	—	131	2	7	—	7	5	2	—	—	58	6	48	4
Wadowice.	Rzyki	March 20	408	1	—	2	2	—	—	2	—	7	—	1	6
	Lipowa	„ 31	92	1	—	8	8	—	3	—	5	8	—	3	—
	Wieprz	„ 29	83	1	—	5	5	—	1	—	4	5	—	1	—
	Ciecina	April 4	46	1	—	1	1	—	—	1	—	2	—	1	1
	Cisiec	„ 9	40	1	—	1	1	—	—	—	1	1	—	—	—
	Total of 5 villages.	—	669	5	—	17	17	—	4	3	10	23	—	6	7
Cracow	Cieszkowice	March 30	300	1	11	—	11	—	2	9	—	11	—	2	9
	TOTAL OF THE WHOLE GOVERNMENT.														
5	41	—	14574	51	67	101	168	8	53	84	23	576	23	361	169

(Translation.) (Enclosure No. 2.)

"*Circular Notice of the Imperial Royal Government of Galicia respecting the Slaughtering of Cattle to prevent the spreading of the Rinderpest.*

"To prevent the spreading of this disease by the means which are at the command of the Minister of the Interior, it has been deemed expedient to issue the following orders:—

"1st. That whenever there are reasons to suspect the existence of the pest, all diseases occurring among cattle shall be carefully watched; and when the least doubt exists as to the nature of the affection, the animal shall be killed, and a *post mortem* examination made with a view of ascertaining as far as possible the exact nature of its ailment.

"(*a*) The disease having been declared suspicious by a medical officer duly appointed for that purpose; and

"(*b*) The local authorities having been informed by the medical officer of his opinion, they shall jointly proceed to value the animal to be slaughtered, according to the manner hereafter described.

"2nd. Slaughtering is to be enforced in the Austrian dominions when the rinderpest already prevails—

"(a) At its outbreak in places which have hitherto been free from it.

"(b) When the disease is well marked in its characters, symptoms, and duration, or by its violence and destructiveness, and when also the police measures which have been already taken have been without effect in checking its progress, so that there is a probability that either the malady by the slaughtering may be suddenly brought to an end, or that its further spreading may be entirely or partly prevented, to enable the communication between healthy and diseased districts to be speedily re-established.

"(c) The ultimate decision as to whether the slaughtering shall be enforced when the certainty of the presence of the rinderpest has been decided on, and to what extent it shall be carried, is to depend on the commissioners who are appointed for that purpose, who, after having been duly informed of the outbreak of the rinderpest or other disease of a suspicious nature, or the spreading of the same in the infected communes, shall, conjointly with those who are charged with the carrying out of the veterinary police regulations, and also, if possible, with a medical officer acquainted with the disease, and two sworn valuers, taken from the commune, who are well acquainted with the price of farm stock, first value the cattle which it has been decided to slaughter. A special report is to be made of the proceedings to the competent authorities.

"3rd. With reference to the question by whom and in what manner the estimated value is to be paid to the owner of the condemned cattle, and whether it is ultimately to be paid by an order on the Treasury from the police authority of the district—

"(a) The owner will receive the full value ordered by the authorities, after deduction has been made for the parts that may be used, as determined by competent authorities, for the cattle which have been killed on suspicion under rule 1, with a view to ascertain if the disease was the rinderpest or not.

"(b) For those cattle where no doubt exists as to the nature of the disease being the rinderpest, and in those districts in the Austrian dominions which are known to be infected. And when the slaughtering shall have been ordered by the authorities, the owner shall only be entitled to receive the amount of their value on condition that he has not neglected any of the precautions which are prescribed by the veterinary police, and thereby contributed to the spread of the infection among his stock, or has in no way concealed the disease after the outbreak on his premises.

"(c) Under the same circumstances of the existence of the disease, the sum named by the valuers, after deducting the worth of the parts allowed to be used, such as the skin and horns, when properly disinfected, will be paid for every head of cattle killed by order of the commissioners.

"(d) With a view to facilitate those proprietors whose cattle have been slaughtered by the commission for the purpose of ascertaining the nature of the disease, and when it has been proved not to be the rinderpest, in replacing their cattle speedily, the district authorities are empowered to order the payment to be made out of the district funds, and to duly inform the superior authorities of the same.

" 4th. To estimate the true value of the cattle ordered to be slaughtered by the commission, the local authorities as well as the sworn valuers will have to take into consideration the market value, age, and breed of every animal submitted to them.

"5th. With regard to the cattle which have been killed as suspected, but which are found on a *sectio cadaveris* to be perfectly free from the disease, the flesh of the same may be used for food, and the hide, horns, and tallow as articles of commerce. Of those, also, which were known to be affected by the pest, or were discovered to be diseased on the making of the *post mortem* examination, the horns, fat, and hides may be used for commercial purposes, but only on the regulations framed for that end being strictly complied with; and it is ordained that in these instances the parts shall be valued, and deduction made from the amount to be paid to the proprietors.

"The attention of the local authorities and veterinary police is specially directed to this point.

"Lastly. It is ordered that these fresh directions of the district government upon the necessity of the slaughtering of cattle to prevent the spreading of the rinderpest be in force from the present time.

"Lemberg, 17th September, 1850."

Immediately on the receipt of these official documents and our letters of introduction from Count Clam Martinitz, we set forward on our journey to Neu Sandec *via* Bochnia, passing over the great rock-salt formation of Austro-Poland in company with Professor Nicklas, of the Veterinary School at Munich, whom we had previously met at Berlin, and who had been sent by the authorities of Bavaria on a similar mission to ourselves.

Arriving at Neu Sandec, our first business was to wait upon the President of the department, who referred us to the district physician for the latest particulars as to the precise location of the disease, as the week's report had not yet reached his office.

It may be as well here to observe that in this part of the Austrian dominions there are no scientifically educated veterinary surgeons; and that from the frequent occurrence of epizootic diseases, both physicians and surgeons are appointed by the Government as inspectors of the health of cattle, and to act also as commissioners of veterinary sanitary police during the prevalence of these affections. To fit them for this purpose, they have to make this class of maladies their special study, and subsequently to undergo an examination as a test of their competency.

By the district physician we were placed in communication with M. Carl Zankel, surgeon and commissioner of Alt Sandec, who received instructions to accompany us forthwith to the different places where the disease existed; and to proceed, in the first instance, to a village called Ludowica, lying at the foot of the high range of the Carpathian mountains, where a case had just occurred, and which it was hoped that we might succeed in seeing before the animal was destroyed.

On reaching Ludowica we were at once admitted within the *cordon*, when we found that this animal, together with nine others which had been exposed to the infection with him, had already been slaughtered and buried. An application was made to have the bodies disinterred, but which for want of due formality was not complied with—Ludowica, in fact, being outside the circle of Alt Sandec, to which M. Zankel was attached, and we not having with us a *special* order from the President to the authorities of the circle we were now in for the disinterment.

The slaughtering had swept away all the animals in the village which were known to have been exposed to the infectious influence of the disease, and consequently we pressed forward through the mountain passes, which here chiefly consisted of the partially-dried beds of rivers and streams, to another village called Zabrzez. It was somewhat singular that at Zabrzez we came upon the identical farm where the malady had first showed itself in this locality, and saw on the premises four of the original Steppe oxen by which it had been brought. Three of these had been the subjects of the disease, but had recovered, and the fourth had resisted the contagion throughout, as was believed, because he had before been affected. They were tied up to fatten, and had every appearance of perfect health, having no trace of disease of any kind about them.

Besides these, there were nine other animals on the farm in quarantine, consisting of three oxen, a young bull, and five cows. They also were feeding, and looking well. Twelve days had elapsed since the occurrence of the last death; and we learned that should no other case happen, the animals would not be liberated till the completion of the twenty-first day from the time of the last death.

Leaving Zabrzez, we went on to Kamienica, five miles distant, and the head-quarters of the Austrian commission, which had been specially sent to administer the sanitary laws applicable to the rinderpest. The commission was constituted of Dr. Anton Karger and M. Johann Rúcki, "Imperial Royal Commissioners of sanitary police for Epizooties," and from them, during our entire stay, we not only experienced all the assistance in their power in furtherance of our inquiry, but likewise the greatest kindness and friendship. We were thus left free to pass as often as occasion required between Kamienica and Zabrzez, and so to act in our investigations, both within and without the *cordon*, as scarcely could be anticipated, when the austerity of military discipline in these cases is considered, and which compensated in a great measure for our oat-straw beds and sour rye-bread repasts.

In Kamienica we found two quarantine stations, in one of which seven animals were placed, and in the other nine. Two days prior to our arrival a case had occurred in the first station, and more were daily looked for. The animal in question, a cow, was observed by her owner, late in the evening of Thursday, April 30th, to be out of health. She was reported early on the following morning, and immediately seen by the Commissioners, who at once recognised the pest. She lived till 2 p.m. on Saturday, May 2nd, only surviving the attack about forty-two hours. After the body had been examined—and which has to be done in every instance—it was buried. The skin, however, was allowed to be removed for the owner's use subsequent to its being disinfected and prepared under the inspection of the proper officers.

At our first visit to these quarantine stations, in company with the Commissioners and Professor Nicklas, and which was late in the afterpart of Monday, May 4th, no indications of disease could be detected in any of the animals—a fact not without some value, as, on our second visit, at 6 a.m. of the following day, an aged cow, one of the seven, exhibited some of the premonitory symptoms of the pest. This case will hereafter be referred to.

According to arrangement, we next proceeded to exhume the animal which had died on Saturday, that we might note for ourselves the several lesions which had been produced by the disease. We found that all the viscera of the chest had been removed, and were lying by the side of the body, and on bringing both these and the carcase to the surface, we were forcibly struck by the circumstance that so little decomposition had taken place, that no unpleasant smell attended our operations, although the animal had been dead about 65 hours. The flesh also was firm, and of a normal colour; the blood, however, was still fluid in the [vessels, and of a darker hue than natural. It will not be necessary to give a detailed account of the morbid appearances which were met with in the viscera, and more especially as, in the course of this report, we shall have to describe these *in extenso* as they were observed in other cases; suffice therefore to say, that although they left no doubt of the animal having died from the rinderpest, they opened up new ideas in our minds as to the pathology of the disease.

Before proceeding to a description of the nature and symptoms of the malady, or the relation of individual cases of it, we propose to give in the next place the

History of the Appearance of the Rinderpest in Zabrzez and Kamienica.

Until the present occasion, the villages of Zabrzez and Kamienica, as well as all the surrounding district, have been perfectly free from the disease since 1846. The present outbreak took place in the month of March, and was due to the introduction of 10 steppe oxen which had been purchased at a cattle fair held at Jacmirz, in the Lemberg division of Galicia. These oxen came with large droves from Bessarabia, and from three to four thousand head were brought together at the fair. Jacmirz is about twenty German miles from Zabrzez, and three full days were occupied in driving the animals to the latter-named place.

They were bought by M. Berl Krumholz, farmer and distiller, and arrived at the farm on the 15th of the same month, and, after remaining a few hours, were sent on to Kamienica, where the distillery is situated. They were here put with 14 fat oxen, but, in consequence of these being sold for slaughtering two days afterwards, the steppe cattle were returned to Zabrzez on the 18th. Here they were placed in a stable by themselves, and stood there until the 20th, when four of them were a second time sent to Kamienica, with 10 head of young stock, and on their arrival were placed with 21 others. On the following day, the 21st, the six steppe oxen left at Zabrzez were observed to be trembling, which being supposed to depend on exposure to cold, they were put into a shed for warmth, in which were 18 other animals, consisting of some young bulls, cows, and two calves. On the 22nd, the four steppe oxen at Kamienica were likewise noticed to be unwell and trembling, and, the true nature of their illness being now suspected, they were immediately removed from the other stock, and orders were sent to Zabrzez for the six to be also taken away and kept by themselves.

As a further security to the stock at Kamienica, early the next morning the four steppe cattle were sent back to the farm at Zabrzez. Notwithstanding this precaution, the disease broke out among the young stock on the 30th, and eight of them died on the first day; and by April 3rd, thirty-one in all were dead. Besides these animals, M. Berl Krumholz had ten others at Kamienica, and the Commissioners decided upon killing them at once, so that he might receive something towards his loss. The entire number, therefore, lost by him Kamienica was 41 animals; and had it not been for the selling of the 14 fat oxen, they also in all probability would have been sacrificed.

On the same day that the disease manifested itself at Kamienica it also broke out at Zabrzez among the eighteen with which the steppe oxen were placed on the 21st. Of the entire 28 animals located here, including the 10 steppe cattle, thirteen died, eleven were killed, three recovered, and one resisted the infection entirely. The three animals which recovered, and the one which escaped the attack, were all steppe oxen: they have been previously mentioned as being seen by us on our first visit to the farm.

The establishment of the *cordon* confined the disease entirely to this farm, although there were in the village altogether 453 head of cattle, the greater part of which were very poor and weak animals, badly fed and badly provided for.

The progress of the disease was rather singular at Zabrzez—thus, 11 of the 13 deaths had occurred by the end of the third day of the outbreak; every one of the animals dying which up to that time had shown symptoms of the disease. On the ninth day subsequent to the death of these, another animal sickened and died, and on the fourteenth day after its attack a second; while in twelve days more a third was taken ill, namely, a young bull, whose case will be hereafter recorded in full as coming under our own immediate investigation.

Notwithstanding that the same sanitary measures were taken at Kamienica as at Zabrzez, the disease reached the village cattle, but was fortunately prevented making much havoc among them. The ultimate result of the outbreak was that, out of 433 cattle kept in the village, 65 were attacked, of which 37 died, and 28 were slaughtered.

In Kamienica the malady chiefly prevailed among the cattle of the small proprietors and peasants; and the daily lamentations of the poor women, to whom was confided the principal care, or rather, on whom was forced the labour of nursing and feeding the animals, at the losses they were sustaining, were most distressing to witness. Nearly the entire means of living of these small farmers depend on the well-being of their cattle; and to see them swept away by such a fatal scourge, could not fail to excite our deepest sympathy. A gloom was cast over the whole village; and fear seemed to be depicted on every countenance, lest the disease should still further extend itself.

As a warning to surrounding places, notice-boards were erected at the different entrances into the villages, setting forth, by their Polish and German inscriptions of "ZARAZA NA BYDLO ROGATE," and "HORN, VIEH SEUCHE," that the pest was there, while each fresh place of outbreak was instantly surrounded by the military *cordon*, and all communication effectually cut off.

Besides Zabrzez and Kamienica, two other adjacent villages in the circle of Kroscienko were the seat of the pest—namely, Tilka and Szchawnica. The total number of cattle kept in the former was 78, out of which 11 were attacked; and of these, 10 died, and 1 was slaughtered. In the latter place, 490 were kept, and 34 became the subjects of the malady; and of these, 25 died, 4 were slaughtered, and 5 recovered. It has been ascertained that the outbreak also in these instances depended upon the introduction of steppe oxen, bought at the same fair.

CHARACTERS OF THE DISEASE.

Infection.—Rinderpest properly belongs to that class of diseases which is denominated special or specific, by which we understand that there is either some certain and particular cause which gives origin to them, or that a marked peculiarity attends their progress and results. Affections of this kind most frequently possess the power of extension, by an inherent property of disseminating the *materies morbi* upon which they themselves depend, and which we recognize by the terms infection and contagion. Thus each victim may be viewed as adding new seeds to the malady, by the exhalations arising from its own body; it being a remarkable circumstance that, when the morbific matter has entered the system, it multiplies to an inconceivable extent before it is cast out by the organic functions. The circumstance of animals, when in health, contracting a disease of the same description as that affecting others with which they are located, is the best proof of the infectious or contagious nature of the malady. The escape of some under the same circumstances may be due to a variety of causes, and offers no satisfactory proof that the disease is *non*-contagious. For example, all animals are not equally susceptible of being acted on at the same time by the morbific matter: some may, therefore, resist its influence to-day, but in the course of a few days afterwards be susceptible of its action.

The facts which have been given with reference to the various outbreaks of the rinderpest do not require the addition of scientific deductions to establish more firmly the infectious nature of the malady. We believe that it stands second to none in its capability of spreading from animal to animal, *the cattle tribe being alone its victims.* If the malady were one that owed its extension to unexplained causes; if it suddenly showed itself in one part of the continent, and rapidly spread, despite all precautionary measures and without the introduction of diseased animals, to others near to or at a greater distance from its origin; if, in short, it possessed all the characters of an epizootic, then we might have some reason to doubt its infectious nature.

It has been stated, on indisputable authority, that any animal which has been exposed to the infection can propagate the disease without itself becoming affected; and that even cattle can do this before they are diseased, in consequence af the *materies morbi* being lodged in the hair which covers their bodies. This is by no means improbable, and the opinion receives support from the circumstance that in numberless instances persons visiting the sick cattle have conveyed the pest to other animals of the ox tribe. Thus we see that in these particulars the disease agrees with the small pox of sheep, or with the plague, small-pox, &c., of man, and that it is as infectious among cattle as the latter-named diseases are among ourselves.

There have been doubters of the infectious nature of the rinderpest; and whenever speculation has been allowed to take the place of facts, although it may seemingly have had science as its basis, great injury has resulted to those most interested in the question. A notable instance of this kind has been furnished us by Professor Renault, Director of the Alfort Veterinary School, and through his kindness we are enabled to transcribe the following particulars.

Towards the end of 1844 the rinderpest, which had prevailed among the cattle in Galicia, passed through Moravia, and made its appearance in Bohemia, in the circle of Koniggratz. The malady had already made some progress in the district, when M. Verner, chief of the Veterinary Department of Bohemia, was sent from Prague by the government to inquire into the precise nature of the affection. This gentleman, who had had many opportunities of seeing the rinderpest, had no difficulty in recognising this disease in the malady in question, and, with a view to arrest its further progress, he recommended to the superior authorities the adoption of those measures which experience had shown to be best calculated not only for this, but to cause its quick extermination; namely, to slaughter the sick animals, isolate those which had been exposed to the contagion, and establish a *cordon* around the infected places. These measures were put in force at once, and soon had the effect of arresting the further progress of the malady, when some young physicians, who had had an opportunity of making, for their instruction, some *post mortem* examinations of the cattle, thought that they recognised in the affection an analogy to that of the *typhus abdominalis* of man. They therefore communicated their opinion to some members of the faculty of medicine at Prague, who, after making several autopsies, came to the same conclusion. A report was accordingly sent to the government setting forth that the malady was not contagious, that it could rise spontaneously amongst the horned cattle of the country by other influences than those of the contagion, and that the means which the government had adopted were not only useless but vexatious. As the faculty had great authority in all sanitary matters, the government, although it did not entirely remove the restrictive measures, still did not enforce them with its usual rigour; the result of which was that in a few weeks the malady had extended into several other circles of the kingdom, committing such dreadful ravages, that the Austrian government took alarm, and forthwith sent M. Eckel, Director of the Imperial Veterinary Institute, into Bohemia. He at once found that it was the rinderpest, and recommended the rigorous enforcement of the former measures, the result of which was that in six weeks or two months afterwards the malady had entirely disappeared in the kingdom of Bohemia."

Incubation.—Like small-pox, and many other affections common to man and animals, rinderpest lies dormant for a time after the infection has entered the organism. This period is found to vary in different diseases, and also in the same disease at different times, as well as with animals which belong to different zoological classes. It is influenced by many external circumstances, such as the manner in which the infection is received, the heat of the weather, temperament of the animal, freedom from other diseases, peculiarity of constitution, &c. None of these causes can be said, however, to prevent the outbreak of the malady, although some of them may retard, and others facilitate, its appearance. During the incubative period, the animal gives no indication of ill-health, and only does so when the disease is about to declare itself.

The time that the poison of the rinderpest lies dormant is also found to vary; many animals sickening on the seventh day after exposure, and others not until the thirteenth or fourteenth. Some are said even to pass to the twentieth day before giving evidence of the malady. Such cases are few and may possibly depend on secondary exposure to the infection rather than on so great a variation in the periods of incubation. These secondary exposures are not unfrequently entirely overlooked, and especially with such an affection as the rinderpest, the infecting materials of which can be conveyed by indirect as well as by direct means. It must not be forgotten, also, tthat it is a rule or law belong to this class of maladies that if an animal passes over the usual period of incubation, it is secure against an attack, and in order to become the victim of an infection, it must be a second time exposed to the influence of the morbific matter. Direct and well-considered experiments are wanting with regard to the incubation of the pest, and these we had no opportunity of making while on our mission. No doubt, however, should be allowed to remain on a point like this, as on it depends the security to be afforded to every country which is contiguous to the steppes of Russia. Austria, which suffers almost annually from this disease in some parts of her dominions, has an especial interest in the question, and should lose no time effecting its complete and satisfactory solution. In our opinion Austria should appoint a commission of scientific men, and vest it with some of her absolute power to conduct experiments and take every necessary means of determining the point in a conclusive manner, for the benefit of other countries as well as herself, and she will then both deserve and receive the thanks of the world.

Spontaneous Origin.—The steppes of Russia are the home of the rinderpest, and here it may be said to hold almost undisputed sway, little being done by the Imperial Government to stay its ravages. Here also, as as has been elsewhere stated, it is alone regarded as having a spontaneous origin, but it is very probable that a scientific investigation would show that it spreads only from infection directly or indirectly communicated to the numerous herds of cattle which inhabit these extensive plains.

Doubtless every disease has had its place of origin, and in it there may exist persistent causes which keep alive, so to speak, the curse of sin. Such causes may possibly be found on these vast plains of Russia; and if so, here would be the natural habitation of the pest. Be this as it may, it is certain that in those countries which are contiguous to the steppes the malady has no such origin, and its appearance in them is invariably associated with the recent introduction of steppe cattle, and generally in the ordinary course of traffic.

No disease which we have ever studied appears to be governed by such precise laws as this, with regard to the means of its extension; and it is difficult to believe that it should spread by infection alone throughout Europe, and not be subject to the same law in the steppes. Supposing the fact, however, to be as asserted, it is evident that peculiarity of breed is not of the causes on which it depends. Large numbers of steppe oxen are met with out of Russia, and in Galicia we saw many which were used for the purposes of husbandry, and these are never known to be the subjects of the pest, unless brought under the influence of the infection. Besides, the Hungarian, Italian, and steppe cattle are all, from their great similarity, evident descendants of the old Roman ox, and yet it appears that in but one of these has rinderpest a spontaneous origin. Hungarian oxen are even said to be less susceptible to the disease than the other breeds met with in the Austrian dominions, and to bear up better against it, so that the percentage of deaths among them is much less than among others.

Exertion has been assigned as the cause of the appearance of the malady, but like breed this too is powerless with all cattle except with the steppe. We do not regard, therefore, the fact of the breaking out of the pest among steppe cattle at the end of a journey as a satisfactory proof that the exertion they have undergone is the cause.

When we observe a malady to be capable of being communicated from animal to animal by innumerable means of conveying the *materies morbi*; and when we take into account the varying susceptibility of animals to the immediate action of this matter, and also the further circumstance of its remaining dormant in the system for a fortnight, or possibly a longer time, we see many reasons for withholding our assent, without greater experience in the disease, to the opinion that the pest has a spontaneous origin in the ox of the steppes.

General Symptoms of the Pest.—When the animal sickens, the affection will be recognised by almost continuous spasmodic twitchings of the voluntary muscles of the body, more particularly those of the neck and shoulders, and of the hind quarters. These twitchings are accompanied by tremors, which are more or less generally diffused, and which interrupt the regularity of the spasms, and give to the animal an appearance of suffering from exposure to cold. The coat stares, and the patient stands with its back arched and its legs gathered together under the body, but does not seemingly suffer much acute pain. In the course of a few hours rumination is suspended, and the appetite fails, but water will generally be partaken of almost up to the end.

The temperature of the body is variable, a slightly increased warmth of skin existing at the beginning of the illness, which soon, however, gives way to chilliness of the surface, and this again to a death-like coldness of the ears, legs, and horns, as the malady advances to a fatal termination. The pulse is scarcely disturbed at first, unless the attack is a severe one; when it quickly rises to 70 or more, but wants tone in its action. In all ordinary cases it becomes gradually more frequent in number, but less in force, and in the latter stages can only be felt at the heart.

The respiration is but very little altered at the commencement; it rarely becomes difficult, and was never painful in any of the cases we witnessed It sometimes rises to 30 on the second day. The contractions of the abdominal muscles are often interrupted in their rhythmical action by the spasmodic twitchings, which give a singular motion to the animal's flanks, and has led some observers to speak of a difficulty of breathing as being invariably present. A discharge comes on early from the nostrils, which has many of the characters of ordinary mucus, but, when carefully examined, will be found to contain flocculi of lymph. A slight cough is also present in some cases; but it cannot be heard except one is near to the patient, when it imparts a singular and almost indescribable sound to the ear.

The expression of the countenance does not denote much acute suffering, and the eyes are without any dull appearance, except in the advanced stages of the malady, when the lids are found to be drooping as in sleep, and the ears to be a little lopped. The vessels of the conjunctival membrane are almost without turgescence; but a discharge in most cases comes from the eyes, which accumulates in a yellow jelly like mass at the inner angle, and when examined is likewise found to be composed principally of lymph.

The bowels are but little disturbed at the very beginning of the disease; but the feculent matter, almost unaltered at first in consistency, is soon passed in increased quantity, and in the course of the second day diarrhœa sets in. This diarrhœa is presently followed by dysentery, which continues to the end. The evacuations are not particularly offensive, but they are remarkably fluid, of a dirty yellow colour, and mixed with numerous small flocculi of lymph. Occasionally a little blood stains the evacuations, and tenesmus is also present in some cases. The abdomen becomes much pinched in, and the animal's strength quickly fails him He now keeps mostly recumbent, and rises very reluctantly. If made to move he staggers, and often falls for want of strength. The spasmodic twitchings now *begin to diminish*, and for some hours before death they have enirely passed off.

A sickly smell attends the patient, but there are no disengagements of gaseous compounds into the areolar tissue, nor any other indications of the decomposition of the tissues which have been spoken of by some writers. In short, the animal dies, apparently, and almost without convulsions, from pure prostration of the vital powers.

In those cases which recover no pustules have been observed as forming on the skin, nor any desquamation of the cuticle or fall of the hair. Nor have any ulcers of the eyes, nostrils, or muzzle been noticed in either extreme or protracted cases.

One of the most favourable indications of a return to health is a less frequent evacuation of fluid from the intestinal canal, and the dejections possessing somewhat of a feculent character. Such animals soon acquire a more lively appearance, look about for some tempting kind of food, and will slowly begin to ruminate. The pulse acquires more tone, the temperature of the body rises, and the respiration becomes natural, but the diarrhœa will not unfrequently continue for seven or eight days.

Duration.—In all cases which tend to a fatal termination, the animals rarely live beyond the fourth day after the symptoms have shown themselves, while very many of them will sink as early as the second day. The greater number, however, die on the third day from the attack. In those which recover, some diminution in the severity of the symptoms usually takes place on the third or fourth day, and if the patient survives this time, even should the symptoms not abate, it is regarded as a favourable indication of ultimate recovery. The return to perfect health is rarely effected in less than three weeks, but much will depend on the age and constitution of the animal, as likewise on the amount of structural disease in the mucous membranes of the alimentary canal, and not a little also on the care and attention which are given the patient.

Percentage of Deaths.—If the pest be allowed to take its natural course for only a few days, it will be found that the deaths not unfrequently number 90 *per cent.* Steppe cattle are, however, said to bear up better against the affection than others, so that about one-half of them will sometimes recover. Speaking, however, in general terms of the different breeds of cattle, as well as of the different circumstances under which they are placed, the mortality will be found throughout Europe to range from 75 to 80 per cent. Fat animals, and those which are well cared for, are found to bear up very badly against the disease.

Post-mortem Appearances.— The morbid lesions produced by the pest will be found centred in the mucous membranes, which are more or less affected throughout the entire body. Commencing an examination at the mouth, it not unfrequently happens that many of the conical papillæ which stud the body of the tongue will show here and there, at their bases, their vascular and epithelial coverings to be broken up by the ulcerative process. The root of the tongue, fauces, and *velum palati*, are also similarly implicated to a greater or less extent, while their follicles are filled with effused lymph, giving to the parts an appearance as if dotted over with some yellow pigment. Some of the follicles are likewise ulcerated, but the major portion are merely distended with lymph.

The tonsils are in a similar condition; and when a section is carried through their long diameter, large portions of lymph can be drawn from their ducts, the yellow colour of which, interspersed in lines along the course of these passages, contrasts strongly with the red substance of the organs. Much turgescence of the vessels of the Schneiderian membrane, with points of ulceration and shreds of lymph, are met with, more particularly about the posterior nasal opening, and base of the vomer. These lesions, however, rarely extend beyond the middle portion of the *septum nasi*.

The pharynx presents the same appearance, but the œsophagus is healthy, as is both the rumen and reticulum in most cases. In some few instances the epithelium readily peels from off the inner surface of these stomachs, when the vessels beneath are found to be turgid with blood. The rumen invariably contains a fair quantity of ingesta in the state usually met with in healthy animals. The omasum is without structural change, or at most its mucous surface presents an analogous condition to that of the rumen and reticulum. The contents of the omasum are frequently so dry and hard that they can be rubbed to powder between the fingers. This has been considered by many continental pathologists as a peculiarity attaching to this disease, and hence the term *Löser dürre* has been given to the malady. In three consecutive *post mortem* examinations, as well as in many others, we found that no alteration, either of the omasum or of its contents, existed which was incompatible with perfect health

The mucous membrane of the abomasum is always highly congested, more especially towards the pylorus; and its follicles are in an analogous state to those of the fauces, *velum*, &c. The duodenum, jejunum, and ileum are similarly affected, but to a greater extent. These intestines often present a bluish aspect on their serous surface, but which is entirely due to the turgescence of the vessels of the mucous membrane, which being seen through the other coats, gives a greater depth of colour to it than natural. Peyers glands are not invariably diseased, but, like other follicular openings of the digestive canal, they are often covered with layers of lymph, beneath which ulceration is occasionally observed, but more frequently the surface is healthy, although turgid with blood.

The chief ravages of the disease, as we have met with them, are in the large intestines. The blind end of the colon—the cæcum—was, in one case in particular, ulcerated over several inches of its inner surface, that is, numerous small and distinct ulcers existed, which had evidently had their origin in the follicles of the mucous coat. Thin deposits of lymph, varying in size from that of a pea to the end of the finger—scabs as they have been designated—usually stud the large intestines almost throughout their whole extent. They are of a dirty yellow colour, and adhere with tolerable firmness to the mucous membrane beneath. In some places ulceration is found to be going on in the membrane; in others this destructive process has ceased, and the healing one commenced, and in most no change of structure can be observed. The terminal portion of the rectum is generally implicated to a far less extent.

The substance of the liver is healthy; the gall ducts, however, contain layers of effused lymph; and sometimes to an amount sufficient to block up the passages. The gall bladder is filled with bile possessing its ordinary characters, but the inner surface of the bladder is not unfrequently in precisely the same state as the mucous membrane of the large intestines.

The kidneys are healthy, and the urinary and generative systems apparently unaffected.

The larynx is occasionally slightly ulcerated, particularly on the edge of the arytænoid cartilages. No ulceration, however, has been seen by us throughout the whole extent of the windpipe and bronchial tubes; but thin layers of effused lymph lying in close contact with the mucous membrane are almost invariably present. The lungs are healthy, of a normal colour, and often remarkably free from congestion. Their serous membrane is also unaffected.

The heart is healthy, occasionally rather flaccid, and without blood in its cavities. The blood in all the vessels is *fluid*, evidently from loss of its fibrine. It is also darker in colour than ordinary venous blood. The brain and spinal marrow give no evidence of structural change; but an increased quantity of fluid is often found in the ventricles of the brain, and especially in the upper part of the *theca vertebralis*. The flesh is firm, of a good colour, and has but little tendency to pass quickly into decomposition; indeed, we have not unfrequently seen it in a state fitted for food.

Pathology.—It is difficult to speak with certainty of the true nature of the rinderpest, but it is evident that the morbific matter on which it depends, having entered the system through the medium of the organs of respiration, soon acts upon the blood, by converting some of the constituents of that fluid into its own elements; and that, while this process is going on, the animal gives no recognisable indications of being the subject of the malady. This period constitutes the incubative stage of the disease.

The blood, having thus become contaminated, its vitality impaired, and the poison augmented a thousandfold within the organism, the brain and nervous systems, as the centres of sensation and motion, have their normal functions necessarily and quickly interfered with, and hence one of the earliest indications of the disease is a spasmodic twitching of the voluntary and other muscles of the body.

The malady has now arrived at a stage when nature makes a bold effort to rid the system of the poison, and in doing this the force of the morbific matter, so to speak, falls with more or less severity upon the mucous membranes throughout the entire body. Effusions of lymph—the fibrine of the blood—take place into the follicles of the mucous membranes, as an effect perhaps in part of the overtaxing of these grand excretory organs, and partly because the fibrine itself is charged with the *materies morbi*, and has probably also lost some portion of its vitality, which renders it unfitted to remain in the vessels. Dark-coloured blood, and which remains fluid even after death from its defibrination, now flows in the vessels; and dysenteric purging also sets in, under which, as a rule, the animal quickly sinks.

If, on the contrary, the *vis vitæ* should be sufficiently powerful to withstand so great an exhausting process, then the poison being cast off, and principally by the digestive canal, the patient slowly rallies, and the functions of the organism are gradually restored. Healthy fibrine again supplies the place of that which was lost, so that the blood will now clot when removed from the vessels, and be once more brought into a state to support the vitality of the prostrated organs.

Ulceration of the mucous membranes, commencing in the follicles, may attend these processes, but it is not a necessary pathological condition of the pest. It is rather to be regarded as a sequence depending for its existence on the amount of the contamination of the blood, the duration of the disease, and the diminished strength of the vital forces.

In all this we have a great similarity to the pathology of the small-pox, but in that disease the external skin is the principal focus of the malady; while in rinderpest the mucous membranes or internal skin are its chief seat. Small-pox frequently proves fatal before the local symptoms are well established; and so, indeed, does rinderpest, from the great amount of morbific matter with which the system is charged.

Names given to the disease.—Of all the terms which have been given to this malady, there is none which we are willing to adopt in preference to "RINDERPEST." It is the one which we have employed throughout this Report, although it may be thought that it is too general in its application, and deficient also in explicitness, to be selected in preference to others which set forth something of the nature of the disease. The term nevertheless explains that the affection is a true *cattle plague;* and, besides this being the one which is used throughout Germany, it is thoroughly understood in nearly every European state—a fact which gives a value above many others.

"STEPPE MURRAIN," although it tends to throw some light on the chief location of the disease, fails to take cognizance even of the kind of animal which is the subject of it, and leaves the pathology entirely unexplained.

"CONTAGIOUS TYPHUS" is far from being appropriate, notwithstanding that the disease has some characters which are common to the typhus of man. The differences which are observed in the duration, progress, symptoms, and results of the two maladies, are far too numerous and important to warrant the pathologist in the adoption of a *definite* term of this kind, and for this reason we have abstained from employing it.

"LOSER DURRE" is, in our opinion, the most inappropriate of any of the names we have alluded to. The hardness of the third stomach, or rather of its contents, which the term implies, is not a speciality attatching to the affection. It may often be present, but it is just as frequently absent. The term directs attention to one particular part of the body as the seat of diseased action; and consequently it often leads to incorrect conclusions. We have seen men of ability, who have been called upon to make *post-mortem* examinations, hesitate to pronounce a decided opinion of the existence of the pest when the third stomach has been found healthy. Hardness or dryness of these contents is common in twenty other diseases of cattle, and in nearly every instance in which it occurs it is but an effect of suspended function of the third stomach, as the cessation of rumination is of the first.

Treatment.—We have very little to report of a satisfactory description of the medical treatment of the rinderpest. Indeed, no attempts at curing the disease are now made, in consequence of the inutility of all the means which have been tried, and the greater risk which is incurred of a still further extention of the malady by the keeping alive of animals which would otherwise be slaughtered at once. The advancement which has of late years attached to the science of medicine would seem to hold out a hope that remedies may be found for this hitherto incurable disease. All experiments, however, undertaken for this object, would have, we believe, but little chance of success, unless they were carried out by, or under the immediate superintendence of, the professors of the different veterinary institutions of those countries in which the pest prevails.

No definite plan of treatment can be laid down, except it is that of supporting the fleeting vital powers while nature is attempting to rid the system of the poison, and then to endeavour to counteract the ill effects which had resulted. Remedies calculated to promote this end must however be selected for each particular case, and also be suited to each particular stage of the malady.

With these few observations on this part of our report, we shall proceed to give the details in full of several cases of the disease which came under our immediate notice.

CASE 1.

Mention has been made of an aged cow, which was observed, on our second visit to the quarantine stations on May 5th, to be out of health, the symptoms indicating that she was the subject of the malady.

Considering the great fatality and the usually rapid progress of the rinderpest, it is somewhat surprising that its victims should so frequently show such little disturbance to their health at the commencement of the attack. The animal in question was a remarkable instance of this, as well as of the occasional mild character of the disease. The chief indications of illness which she exhibited, when first seen, were tremors of most of the voluntary muscles of the body, but more especially those of the extremities. The *triceps* muscles of the fore-limbs, and the *glutei*, *vasti*, and *triceps* in particular of the hind-limbs, were most affected with these tremblings; besides which a spasmodic jerking of their fasciculi could be detected as coming on at irregular and short intervals. The animal stood with her back arched and legs gathered together under the body. The head was extended, ears lopped, and coat staring. She was remarkably dull, and greatly indisposed to move. Her appetite was impaired, but not lost, as at times she would pick a little fresh grass. Rumination was tardily performed; the action of the bowels unaffected; the breathing natural, and the pulse almost undisturbed. Indeed, had the morning been a cold one—which it was not—nearly the whole of the symptoms that she exhibited might have been ascribed to an exposure to the bleak mountain air.

Towards the after part of the day, the spasmodic contractions of the muscles were more diffuse. The jerking of those situated at the infero-lateral part of the neck was very peculiar, imparting a movement not very dissimilar to the so-called venous pulse. The skin was rather warmer than natural, but the coat was staring, as in the morning. The breathing still continued undisturbed, while a slight but "thick cough" was occasionally heard. The pulse had risen to about 62. It was regular in its action, but beat with somewhat diminished force. There was no injection of the visible mucous membranes present, nor dryness of the muzzle, as seen in active febrile diseases. The Commissioners expressed their decided opinion that this was a true case of the pest, although an unusually mild one, and they therefore gave orders that the cow should be taken from the others, and placed in a separate shed, temporarily erected with the branches of pine trees for the purpose, so that we might watch its progress.

May 6th, 7 A.M.—The symptoms upon the whole have undergone but little change since last evening. The animal still takes a little food, but is equally as dull and dispirited. She shows a disposition to drink freely of water, and would take even more than it is desirable to give her.

8 P.M.—No alteration of importance.

May 7th, 6 A.M.—A change for the worse has come on during the night. The prostration of strength is considerable, and the animal is down, unable to rise. Neither the pulse nor the breathing has, however, undergone much change, the principal being that the action of the heart is rather weaker. She refuses food. Rumination is suspended, and the bowels are rather irritable, voiding large quantities of fæces. The twitching of the muscles are yet present, but mostly confined to the shoulders and neck. The cough is more frequent, and a little mucous discharge also comes from the nostrils. The conjunctiva is uninjected, but the eyes are somewhat intolerant of light. The general surface of the body is chilly, as are the legs, ears, and horns.

On visiting the animals in the evening, we found that a slight diarrhœa had set in during the day; that the pulse had risen to 70, and that increasing weakness was existing. There were, however, but few indications that the attack would terminate fatally, the other symptoms remaining about the same.

May 8th.—The twitchings of the muscles are scarcely to be observed this morning, as is generally the case in the advanced stages of the malady. The diarrhœa is, however, more copious, but yet not alarming; the pulse is quicker and weaker, and only to be felt at the heart. The breathing has now become somewhat increased, but is neither laboured nor difficult. The body is cold, and the animal lies with a drooping head and closed eyes, as in a state of drowsiness, refusing all food, but showing the same disposition to take water.

The Commissioners explained that they considered there was no chance of the animal's ultimate recovery, although the case would doubtless be a very protracted one. They also said that they had decided to have her killed in the after-part of the day, if we had seen enough of the disease in its mitigated form, that we might institute a *post mortem* examination. This arrangement met with our concurrence, and especially as other cases had occurred since this cow was attacked, and which we were busily engaged in watching the progress of, as by it an opportunity would be afforded of seeing the lesions which were early produced by the malady.

SECTIO CADAVERIS.—*Respiratory Organs*.—Mucous membrane of the nasal cavities slightly congested, and covered in patches by a small quantity of a yellowish and somewhat viscid discharge. Larynx healthy; trachea nearly free from injection, but containing some thin shreds of colourless lymph lying in close contact with its lining membrane. Bronchia healthy; lungs perfectly healthy. No effusion in to the thorax.

Circulating Organs.—Heart and its vessels healthy. Blood, dark in colour and but partially coagulated; the coagulum being very soft.

Digestive Organs.—Tongue healthy; fauces and velum congested; pharynx and œsophagus, healthy. Rumen healthy, containing a fair amount of ingesta. Reticulum and omasum likewise free from structural disease, and no hardness of the contents of the omasum (löser dürre). Slight efflorescence of the mucous membrane of the abomasum in patches was present, while nearly throughout it was likewise dotted over with yellowish points, produced by effusions of lymph into its follicles. The contents of this stomach were fluid, in which floated some shreds of lymph. The duodenum, jejunum, and ileum were nearly free from disease, presenting only here and there a similar state of the mucous membrane to that of the abomasum. The cæcum, colon, and rectum were filled with fluid fæces; but their mucous membrane was, on the whole, free from change.

Liver, healthy in substance; the gall-ducts were, however, enlarged and thickened in their coats from chronic disease, associated with depositions of osseous matter. The gall-bladder was filled with bile, and its mucous membrane was likewise studded with effusions of lymph into its follicles analogous to the abomasum.

Pancreas and Spleen.—Healthy.

Urinary System.—Kidneys, bladder, &c., free from disease.

Nervous System.—Brain, spinal marrow, and their membranes healthy in so far as their structural appearance was concerned.

CASE 2.

May 6th.—After giving our attention this morning to case 1, we went over to Zabrzes to inspect the cattle, which we saw at M. Berl Krumholz's farm at the time of our first visit. Here we found that a young bull, two years and a half old, and one of the nine animals formerly referred to, as still being in quarantine, was the subject of the malady. The animal in question had only been observed to be unwell early this morning, being twelve days subsequent to the death of the last victim. The symptoms now present were spasmodic twitchings of the muscles, more particularly of those of the neck and shoulders. The spasms succeeded each other with great irregularity, but numbered on the average about ten in the minute. They were likewise accompanied with slight shiverings of the entire body. The skin was warm, as were also the legs, horns, and ears. The back was arched and the animal stood with his legs gathered under the body, but frequently shifted his position as if in pain. His countenance, however, was more animated than is generally seen, even in the early stages of the malady. There was a little turgescence of the vessels of the conjunctiva, but no intolerance of light. A slight mucous discharge flowed from the nostrils, and a short, but nearly inaudible cough was present. The breath was sweet, and the respiration scarcely disturbed. The pulse was increased to 80, and had more fulness than is usual in these cases. All desire for food had ceased; rumination was suspended, and the bowels were in a relaxed condition.

6 P.M.—The symptoms are somewhat aggravated. The animal is down and is more depressed than in the early part of the day. Diarrhœa has set in, and some tenesmus is present. The twitching of the muscles is more violent and frequent. The cough is increased, as is the discharge from the nostrils; the pulse, however, remains the same.

May 7th.—There is no great change in the general character of the symptoms this morning. The diarrhœa is, however, more copious. The pulse is weaker, but its number is not increased. The breathing is but little altered. The cough is of the same mucous character. The nasal discharge is thicker and contains shreds of lymph. The eyes are heavy. The animal keeps laid a good deal, and when down appears sleepy. The spasmodic contractions of the abdominal muscles, which at times are considerable, give a peculiar tremor to the whole body and interrupt the rhythmical action of inspiration and expiration. Pressure on the spine augments these spasms as well as those of the muscles of the neck and limbs. He refuses all food, but takes a little water.

6 P.M.—Except that the animal is weaker, and the alvine evacuations more fluid, there is no change which needs to be specially reported.

May 8th.—The spasmodic twitchings are less diffused than yesterday and not so severe. The pulse is, on the contrary, more rapid, and so weak as to be felt with very great difficulty except at the heart. The respiration is also increased, and now numbers twenty-six in the minute; it is not, however, laboured. The cough although frequent is scarcely audible; it has the same mucous character. The muzzle is moist, but cold, as are the extremities and horns; while the surface of the body is yet warm. The diarrhœa has passed into dysentery. The evacuations are now of a dirty-yellow colour, and remarkably fluid; they contain flocculi of lymph, and are occasionally streaked with blood, but are not particularly offensive. A sickly smell attends the patient. The eyelids are drooping, and a thick jelly-like mass of a pale straw colour has accumulated at the inner angle of the eyes. This is evidently composed chiefly of fibrine; yet the vessels of the conjunctiva are not turgid with blood. The animal has a greater disposition to keep laid, and often while recumbent turns the head to the side as if suffering slight abdominal pain.

May 9th.—The spasmodic twitchings and the tremors are no longer to be recognised, having entirely passed away. The prostration of strength is very great. The dysenteric purging continues unabated in severity. Tenesmus is present, and the evacuations are now very offensive. The abdomen is much pinched in. The respiration remains the same in number, and is occasionally accompanied with a nasal blowing-like sound. The discharge from both the nostrils and eyes is augmented in quantity: the eyes, however, still retain their transparency, and the blood vessels are but slightly injected. The pulse is not weaker than yesterday, but upon the whole a little more distinct. The ears, horns, and extremities are still a little warm. The animal takes a small quantity of water, and appears to be free from any acute pain.*

May 10th.—The symptoms are somewhat diminished in severity this morning, leading to the hope that the animal may possibly rally. The dysenteric purging is less in quantity, and the evacuations also are less frequent. The breathing is more tranquil, and the cough more audible. The pulse has sunk to 70, and has an increased tone. Each rising of the artery is accompanied with a peculiar jerking action. The discharge from the nostrils and eyes has not undergone any material change. The extremities and surface of the body are warmer, and the animal is evidently freer from suffering. He lies less; takes freely of water, and shows a little disposition to pick some fresh green clover, a handful of which we gathered for him.

May 11th.—Scarcely so well to-day. Some blood is occasionally passed with the alvine evacuations. These are still fluid, have a fetid smell, are of a pale colour, and contain numerous shreds of lymph. The abdomen is more pinched in. The pulse is rather quicker, as is the breathing, the expirations being at times accompanied with a slight grunt. The discharge from the eyes and nostrils is less, but the cough is more frequent. He has, however, eaten a little clover and drank some water, and stood up at intervals for a longer time than before.

This change in the symptoms made us most desirous of watching the case to its close, but the commissioners ordered that the animal should be killed forthwith, as they saw no hope of recovery, and were anxious to remove the *cordon*, there being no cattle left on the premises, except the Steppe oxen, mentioned as having some weeks since recovered from the pest.

Post-mortem Examination.—On removing the skin, the muscles were found of their usual colour and integrity, and the areolar tissue throughout was free from congestion. Commencing the examination of the internal organs at the nostrils, the Schneiderian membrane was observed to be much congested, more particularly that portion of it which is continued into the *posterior nares*, where it was extensively ulcerated. This ulceration could be traced from thence to the free edges of the *velum palati*. In places it was concealed by a thick layer of lymph, which adhered with tolerable firmness to the membrane beneath. The larynx, trachea, and bronchi were free from disease, as were also the lungs. The heart was healthy. It contained within its ventricles a small quantity of blood, which was *partially coagulated;* the coagulum being very soft.

The tongue was healthy, as was also the pharynx; but the ducts of the tonsils were filled with effused lymph, the sur-

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* The Commissioners decided to-day upon slaughtering the remaining eight animals in the quarantine, as two or three of them were giving indications of approaching illness. They also had in view the raising of the *cordon* at an earlier date than it otherwise could be, supposing the malady was allowed to take its ordinary course; for, as elsewhere stated, it has to be maintained for *twenty-one* days after the death or the killing of the last animal. The chief object in keeping up the *cordon* for this length of time is to prevent the possibility of a fresh outbreak. No newly-purchased cattle are therefore allowed to come on to the farm, nor is any labourer, or other person, allowed to leave it. No straw or fodder of any kind is permitted to be removed: in fact, all the details are as rigorously enforced during these three weeks as while the disease exists.

The resolve of the Commissioners afforded us the opportunity of witnessing the form of valuing the cattle *for slaughtering* on the part of Government, their real value being greater than the estimated one. For this purpose a jury of three persons was summoned, consisting of the Burgomaster of the village and two other inhabitants conversant with the worth of cattle. They were not, however, allowed to come within 200 paces of the line of the *cordon*. The non-medical Commissioner, M. Rucki, took his seat on a table placed on the line, and being furnished with writing materials, noted every particular of the transaction. The cattle were then brought one by one to within a short distance of the Commissioner, to be inspected by the jury, who asked a great variety of questions relating to their age, breed, and use for feeding, milking, or working purposes; which being satisfactorily answered, they made their award.

		£	s.	d.
The first, a young heifer, was valued at about, in English money		4	0	0
The second, also a heifer	do.	4	0	0
The third, a milking cow	do.	7	0	0
The fourth, a young steer	do.	3	6	0
The fifth, an older steer	do.	4	18	0
The sixth, a young bull	do.	4	0	0
The seventh and eighth, two heifers	do.	8	16	0
Total		£36	4	0

The skins of the animals were next valued at 8s. each for the larger ones, and 6s. the smaller, which sums, we were informed, would be deducted from the gross amount, the proprietor being allowed to dispose of them as he thought fit, after they had undergone a disinfecting process, under the immediate superintendence of the Commissioners. This part of the ceremony being ended, the animals were led away to be slaughtered and buried, when the jury were permitted to approach the table to sign their award. One only of the three could write, namely, the Burgomaster, and he received authority to sign for the others. The appearance of these men was certainly picturesque, if not very prepossessing. They were very scantily clad, having on scarcely any clothes except a long coat made of a coarse and thick woollen material of a dirty-white colour, and reaching to below their knees. The Burgomaster differed but little from his compeers, excepting that he wore a leathern girdle, furnished with a pocket, around his waist, in which he carried his money, and of which, little as it was, he appeared very proud. Their legs were enveloped in pieces of linen tied on with string, and their feet were protected by roughly-made sandals, having very thin leather soles, being apparently of their own manufacturing.

rounding vessels being turgid with blood. The œsophagus, rumen, and reticulum were in a normal condition. The contents of the omasum were rather dry from retention, but no structural change had taken place in the stomach itself. The mucous membrane of the abomasum was slightly ulcerated in small-sized patches here and there, while nearly throughout its follicles were distended with lymph, more especially towards the pylorus.

The mucous membrane of the small intestines was congested, the bowels themselves containing numerous flocculi of lymph. Several of Peyer's glands were ulcerated. In some, arrestation to this process had taken place, and the healing one had begun. All these glands were covered more or less with a thickish layer of effused lymph. The mucous membrane of the cæcum was extensively ulcerated at the blind end, and throughout the intestines it was thickly beset with scabs of a dirty yellow colour. Many of these scabs—the product of lymph effusions—covered surfaces in which no disease could be detected. Other of the scabs had ulceration going on beneath them, while under several the healing process had commenced. They varied in size from that of a small pea to the end of the finger. They were also of different forms and thicknesses.

The colon was in a similar condition to the cæcum, as was likewise the rectum to within a few inches of its termination. These intestines contained no fæces, but were filled with a fluid of a yellowish colour, in which floated many shreds of lymph. The liver was healthy, but the lining-membrane of the gall-bladder was in a precisely similar condition to that of the large intestines. The kidneys were pallid, but unchanged in structure. The bladder and genital organs were perfectly healthy. The brain and spinal marrow gave no evidence of structural change, but effusion of serous fluid had taken place into the theca vertebralis.

CASE 3.

May 7.—The animal, a very poor and weak heifer, was reported by the sentinel on night duty at the quarantine in Kamienica to have been observed early this morning to be giving indications of the disease. The symptoms noticed by us on our visit consisted in chief of spasmodic twitchings of the muscles of the neck and extremities in particular, associated also with general shiverings of the body at irregular intervals; pulse 60, having a sharper beat than natural; a loathing of food; suspension of rumination; grinding teeth; lax and copious fæces; depressed countenance, drooping eyelids, lopped ears; staring coat, arched back, and chilly surface of body; the animal standing with its legs gathered together under the belly. The respiration was, however, undisturbed; the vessels of the conjunctiva uninjected, and the muzzle moist. No tenderness along the course of the spine was evinced on the application of pressure.

At night, with the exception of increased weakness and the passing of more fluid fæcal evacuations, there was no material change in the symptoms.

8th.—The pulse now numbers 65, and has lost its sharp beat; the breathing is a little quickened; the diarrhœa has passed into dysentery; the animal's appearance is very dejected; a discharge flows from the nostrils and eyes; the coat is staring; the spasm of the muscles more intense; the extremities and body are cold; and the prostration of the vital powers very considerable.

9 P.M.—The pulse has risen to 75, and can be felt only with difficulty in the arteries; the breathing has become very much quicker during the day, and now numbers 24 in the minute; the dysentery is profuse; tenesmus is likewise present. The other symptoms remain about the same as in the morning.

9th.—The symptoms are all increased in severity, excepting that the tremors have nearly disappeared; the abdomen is much pinched in; small quantities of blood stain the alvine evacuations, which are likewise very fœtid; the pulse is remarkably tremulous, and the respiration is short and quick. The animal will, however, take a little water to drink.

10th.—During this day she struggled on against the disease, but sunk about midnight, being far too weak to rise for several hours before death.

Post mortem—eight hours after death.—No congestion of the superficial vessels, nor change in the colour of the flesh, was observed on the removal of the skin, nor was there but little tendency to decomposition of the body. The blood, however, was *fluid* and of a dark colour in all the large veins. Ulceration had commenced in several places on the dorsum and root of the tongue, especially around the bases of the conical papillæ. The fauces, *velum palati*, pharynx, larynx, were also ulcerated here and there in patches of about the size of a shilling; the mucous membrane of the posterior nasal opening was intensely reddened, and studded with yellowish-coloured points from effusions of lymph into its follicles; the ducts of the tonsils were also filled to repletion with lymph. The lining membrane of the windpipe and bronchial tubes was but slightly congested, but in many places it was covered with *layers* of effused lymph. The substance of the lungs was healthy, as was their serous covering. The heart was rather flaccid; no blood was found in its ventricles.

On opening the abdomen some petechial spots were found on the omentum, otherwise the serous membrane was free from any vascular injection. The fourth stomach, and also the small intestines, presented a dark-coloured condition of their outer coat; but this was ascertained to depend on the congested state of their mucous lining as seen through the other coats. The first stomach—rumen—was free from disease; but its epithelial lining could be readily peeled off in places, doubtless from changes which had taken place since death. This stomach contained some rather dry ingesta. A similar state of things was met with in both the reticulum and omasum, but no true löser dürre existed. The lining membrane of the fourth stomach—abomasum—was intensely reddened throughout, and its follicles crammed with lymph. Effusions of lymph adhered in many places, as scabs of a dirty yellow colour, to the mucous membrane of this stomach.

The duodenum, near to the pylorus, was in a similar state to the fourth stomach, as were the jejunum and ileum in several detached places along their course. Peyer's glands were free from ulceration, and several of them had every appearance of health. The mucous membrane of the large intestines was ulcerated here and there; while in other parts no change of structure could be detected. These intestines contained much mucus mixed with shreds of lymph. The liver was healthy in its substance, and the gall bladder was filled with a greenish coloured bile. Its lining membrane was free from disease, but thin bands of lymph could be drawn from out of many of the large biliary ducts. The urinary and genitive organs gave no evidence of disease. The brain and spinal marrow were firm, and presented no structural change; but an unusual quantity of fluid existed both in the ventricles of the brain and also in the upper part of the theca vertebralis.

In consequence of the occurrence of this case, and of Case No. 1 in the same quarantine station, the Commissioners determined to slaughter the rest of the cattle, consisting of five, reserving only the animal in question for our special purposes. This resolve was taken on May 8th, and was somewhat hastened by the circumstance that all the animals were in very low condition and of little value, being the property of small farmers but one degree superior in position to the peasants. The greatest difficulty also existed in procuring sufficient food for them; and poor women, the wives of the proprietors, could be daily seen standing in the mountain streams for hours together, up to their knees in water, with scarcely clothing sufficient to cover their persons, washings couch grass, which had been picked from off the land in order to feed these cattle. The step was, doubtless, rendered necessary by the circumstances; it was nevertheless most painful to witness the lamentations of the poor women on its being carried into execution.

Shortly after the removal and slaughter of the animals, the quarantine station was set on fire, and soon rased to the ground.

CASE 4.

On the evening of May 9th, information was brought to the Commissioners that a fresh outbreak of the malady had occurred in the village of Kamienica. On hearing this, we were almost immediately on the spot; and found that a cow, one of five of the herd, was fast *sinking from the disease.* It was evident that she had been ill for at least two or three days, but had not been reported. The Commissioners expressed much dissatisfaction at this, and immediately took possession of all the animals, and sent them off the premises into quarantine. The key of the stable in which the cow had been standing was delivered over to the custody of the military, and the *cordon* established. We may here repeat, that if the proprietor conceals the fact of the appearance of the pest among his cattle, or has been in any way instrumental in bringing it among them when it prevails in the locality, the entire loss which he may sustain falls upon himself, the Government refusing to make any allowance even for those that are ordered to be killed by their officers. This course was, therefore, the one adopted.

The most marked symptoms shown by the animal in question were—a profuse dysenteric purging; indistinct pulse; rapid breathing; surface of body and limbs cold; eyes sunk in their orbits; discharge of mucus, mingled with lymph, from the eyes and nostrils; staggering gait, and great prostration of strength. Indeed, on the way to the quarantine station, she fell twice, although the distance was not more than three hundred yards. It was also with much difficulty that she was made to rise. In this condition she lingered on for about eight hours, when death put an end to her sufferings.

The principal lesions met with, in making the *post mortem* examination, were—ulcerations at the root of the tongue and extensive turgescence of all the surrounding vessels; tonsils loaded with effused lymph, and also all the follicles of the fauces and contigous parts; large shreds of lymph existed in the windpipe and bronchial tubes. The heart was pale and flaccid. The abomasum was not so much affected as in other cases we have quoted, nor was any portion of either the small or large intestines. Where diseased, the lesions of these vicera were precisely similar to those already described. The mucous membrane of the gall-bladder was extensively diseased, but the ducts of the liver were free from deposits of lymph. Excess of fluid existed in the ventricles of the brain and also in the spinal sheath. All the organs which have not been specially named in this case were free from strictural change.

CASES 5, 6, 7, 8.

The animals which formed the subjects of these cases were the companions of Case 4. Three of them exhibited the usual symptoms which are seen at the commencement of the pest on the morning of May 10th, and the other was taken ill during the next day. The character and progress of the symptoms in the first three were about the same as usual, and therefore do not call for any particular remarks. The opportunity was afforded us of watching these animals during the whole of May 10th, the Commissioners allowing them to be kept for that purpose; but on the following day, as soon as the only remaining animal (Case 8) was attacked, they were all slaughtered. The malady was quickly running its course at this time, and doubtless would have terminated fatally in all the animals within a day or two; indeed, in one of them the symptoms were now so much aggravated as to convince us that a few hours would suffice for it to succumb to the pest.

The *post-mortem* examination, which we made in each of these cases, showed that in all essential particulars the morbid changes agreed with those we have already given in detail. Slight differences were observed both in the extent and location of the principal lesions, but these it is unnecessary to describe. Indeed a careful perusal of the cases we have selected for embodiment in this report will, we hope, sufficiently explain these, even to the medical as to the non-medical reader.

AUSTRIA.

In our return journey from Galicia we visited Vienna, and went from thence to Munich, Stuttgardt, and Frankfort, with a view of ascertaining, by a personal examination, the state of things in Southern Germany and Rhenish Prussia. In no division of the Austrian dominions, except Galicia, has rinderpest prevailed during the present year; Bohemia, Moravia, and even Hungary have been entirely free from it. The disease existed in several parts of the empire in 1855 and 1856, but was suppressed in the usual manner. It was introduced from Bessarabia, whence it appears that it generally comes.

Some anxiety was shown for fear the malady might be disseminated by the bringing together of animals from different countries at the great Agricultural Exhibition at Vienna, which took place in May last; and the directors of the show, early in April, issued a notice, in which they stated "that the cases of disease which had occurred in Moldavia and Silesia had been confined altogether to the individual animals which had been imported, and that the cattle of the country was free from all murrain." It was further notified, that on the days appointed for the admission of animals for exhibition the transport to Vienna of *cattle intended for the slaughter-house* would not be permitted by railroad, and that the conveyance of the cattle to be exhibited would be effected in perfectly new waggons.

The extent of the last outbreak in Austria, its duration, &c., will be shown by the following official report:

Report on the State and Progress of the Rinderpest in the Austrian Empire in the Years 1855-6.

Governments.	Date of the breaking out of the Disease.	Date of the receipt of the *last* Report.	Number of cattle in the whole District.	The Disease existed in			Number of cattle in the affected Villages.	Result.			Date of the disappearance of the Disease.	Remarks.
				Circles.	Villages.	Farms.		Escaped.	Deaths	Slaughtered.		
	1855.	1856.									1856.	
Bakowine	October 3	April 15	8,121	—	16	—	699	332	367	—	April 15	
Cracow	August 29	Jan. 31	11,667	2	23	—	881	70	787	24	Jan. 31	106 in quarantine at the date of the Report
Lemberg........	August 29	Nov. 4	79,315	8	200	1723	8,113	1,679	6,232	97	—	
Ofen	August 20	Nov. 2	49,859	9	85	—	13,335	10,409	2,916	10	—	
Oldenburg	Sept. 5	Jan. 31	8,235	8	21	481	1,981	950	1,006	25	Jan. 31	
Grosswardein....	May 2	Jan. 28	8,632	1	3	8	3,375	2,348	1,030	2	Jan. 28	
Pressburg	July 23	Feb. 15	54,246	9	114	4,814	15,760	7,845	7,845	70	Feb. 25	
Katchau........	July 1	April 8	38,142	6	106	2,926	11,068	6,379	4,575	114	Feb. 28	
Moravia........	Sept. 4	Mar. 16	11,568	41	17	507	1,553	230	915	408	March 16	
Upper Austria ..	October 29	Jan. 4	636	2	3	3	8	—	2	6	Jan. 4	
	1856.											
Lower Austria ...	Feb. 21	Mar. 12	127	1	1	2	11	—	3	8	March 12	
Total	—	—	270,548	87	589	9,964	56,784	30,237	25,678	764	—	

As the facts set forth in this Report are so explicit, that no comments thereon are required, we may proceed to state, that after leaving Austria we made our way into

BAVARIA.

This country, in common with so many others which we had visited, has likewise been perfectly free from the rinderpest, since from 1813 to 1815; its outbreak at that time being referable to the same cause as in Belgium, &c., namely, the passage of the Austrian army into France.

Professor Niklas, of the Munich Veterinary School, who had returned earlier than ourselves from Galicia, informed us that pleuro-pneumonia was the chief epizootic disease which prevailed in Bavaria, but that it had not existed to any considerable extent of late years. The sanitary laws to limit its spread are similar to those in other countries, being founded on the fact of the contagious nature of the affection. Animals which have recovered from an attack are marked on their horns with the letters L. S., signifying that they have been the subjects of *Lungenseuche*, it being thought that from the partial disorganization of their lungs they may be the means of spreading the disease for several months after their convalescence.

With regard to rinderpest the laws are very severe; and through the kindness of Professor Niklas, we are enabled to give the following details of their provisions:—

During the continuance of the disease, no cattle, dead or alive, are allowed to be brought across the frontier. Flesh, hides, entrails, horns, hair, and tallow of cattle, and bones, whole or crushed, of any animal, with their hair, wool, or bristles, are also especially prevented crossing by the *cordon;* as are woollen cloths, scutchings of leather, feathers, farmyard manure, hay, clover, straw, and all other descriptions of cattle fodder.

When the disease occurs on a farm, the affected animals are not removed from the sheds, but the apparently healthy are taken to the quarantine station. Each commune is obliged to provide a station of this description, which is built of wood and divided into two parts, one for the doubtful cases, and the other for the supposed healthy.

The Commissioners have the power of allowing medical treatment of the animals, but the veterinary surgeon must remain in the quarantine and receive all he requires at the end of a long pole. All churches, schools, and public-houses of the district are closed so as to prevent the congregating of people together, and remove those inducements which might cause persons to come from infected farms.

On the occurrence of illness among cattle from *other* causes as well as the pest, the Commissioners do not, as a rule, approach the animals; but, standing at a distance, and within sight of them, they arrive at a decision as to the nature of the ailment, frequently ordering some food to be offered as a test of their freedom or otherwise from the malady. In those instances where the Commissioners enter the stable, they are compelled, before leaving, to wash their hands, &c., with vinegar, and have their clothes fumigated with chlorine gas.

All dogs, cats, rabbits, domestic poultry, pigeons, &c., have to be kept in places of security and close confinement. If the disease exist in a village through which a high-road runs, the course of the road is turned, if possible; but when this is not practicable, then a guard accompanies the several travellers who arrive at the boundaries of the *cordon*, to see that they do not go upon an infected premises. The *cordon* is frequently maintained by the peasants; but none are taken for this purpose from an infected village, the selection being made from contiguous villages or farms where the cattle are healthy.

As soon as the malady is observed in a commune, notices are sent to all the surrounding places, that precautionary measures may be immediately adopted by the owners of cattle. Each commune has to provide a place for the burial of the animals which die or are slaughtered, and also a waggon and horses to carry them upon; and, on the disease passing away, the waggon is burnt, and the horses are washed with a solution of chlorinated lime. The place of interment is likewise enclosed, and not allowed to be disturbed for several years.

On an inspection of supposed cases, the animals which give indications of the malady by spasmodic twitchings of the muscles are ordered by the Commissioners to be taken to the burial-ground, where they are killed, and interred with their skins on, these being cut in the usual manner. Occasionally, a special order of the Government permits the removal of the skins, which are then to be subjected to a disinfecting process, under the immediate superintendence of the Commissioners. If but a few cases occur in a large herd of cattle, the Commissioners have the power to suspend the slaughtering of the exposed animals for a few days, in order to watch the result: such animals have a value put upon them, which is paid by the Government. Should no animal fall ill within twenty days from the death or slaughtering of the last case, then the quarantine is raised; but the cattle which have been liberated are not allowed to go near to others until they have been washed with a solution of chlorinated lime. On the discharge of the animals, the quarantine station is rased and burnt.

The Commissioners have to report day by day every occurrence to the Government, and to give the fullest particulars, even to the names of the persons employed at the *cordon*, and the age, colour, sex, &c., of the cattle in the quarantine. The hay on a farm at the time the pest occurred is not allowed to be used for cattle, but must be consumed by horses and sheep.

Such are the regulations existing in Bavaria; in substance they agree with others which have been previously given, but nevertheless we are of opinion that they should find a place in this Report, as several of the details are singularly minute in providing against an extension of the evil. A great difficulty must evidently belong to the carrying out of the requirement respecting the consumption of the hay, and more particularly if the malady should break out in the autumnal period of the year, as then nearly the whole crop would be in store. This regulation, we believe, has been enforced, because it not unfrequently happens that, in accordance with custom, the whole of the hay of a farm is placed on strong floors above the cattle-sheds, and not put into ricks as in England.

WURTEMBURG AND THE SURROUNDING GERMAN STATES.

We learned from Professor Hering of the Veterinary School at Stuttgardt, that, like Bavaria and other kingdoms and States, Wurtemburg had experienced no outbreak of the rinderpest since 1815, and that its existence at that time was also due to the movements of the Austrian army. The regulations of the sanitary police are almost identical with those in force in Bavaria, both with regard to the rinderpest, and also pleuro-pneumonia.

Cattle are reared in large numbers in this kingdom, and are fed for the market principally by the sugar-manufacturers, distillers, and brewers. When fat, they are exported for the supply of the French towns, and Paris in particular. With the exception of Swiss cattle, which are imported for the improvement of the native breeds, very few animals are sent into Wurtemburg from any other country.

RHENISH PRUSSIA.

It could hardly have been expected that this province would be found otherwise than perfectly free from the cattle pest: indeed, in our inquiries of veterinary surgeons, it was somewhat singular that we did not meet with one who had even seen a case of the disease.

Our investigations into the extent of the cattle-pest may be said to have been here brought to a close, and to have shown that even should a revival of the trade in cattle, which had been spoken of in the former part of the report, take place to England through Holland, by means of the Rhine, there would be no risk incurred of introducing this disease thereby, unless circumstances should unfortunately arise, by which it became as rife as it was in the years 1813, 1814, and 1815.

As the limits which are ordinarily assigned to reports of this description may have possibly been exceeded, we feel that it would not be right to make any observations in addition which are not of a practical character, and therefore we content ourselves by appending a summary of the facts which have been ascertained by us in the fulfilment of our mission.

CONCLUSIONS.

1. That all the countries of Northern and Western Europe from which cattle are exported to England are perfectly free from the rinderpest; and that the only disease of an epizootic or destructive nature which prevails therein is the one known to us as pleuro-pneumonia, which disease has existed here since 1841.

2. That in the greater part of the official dispatches and reports which have been forwarded to the Government, and by them transmitted to the Royal Agricultural Society of England, the Rinderpest has been confounded with Pleuro-pneumonia, "Milzbrand," and other destructive maladies to which cattle are liable.

3. That the Rinderpest is a disease which specially belongs to the Steppes of Russia, from which it frequently extends, in the ordinary course of the cattle-trade, into Hungary, Austria, Galicia, Poland, &c.

4. That whenever circumstances have arisen which called for the movements of troops, and consequently the transit of large numbers of cattle, in Southern and Eastern Europe, and particularly when Russian troops have crossed the frontier of their territory, the disease has been spread over a far greater extent of country.

5. That the disease which has recently prevailed in Galicia—where it was specially investigated by ourselves —as well as in Poland, Austria, Hungary, the Danubian Provinces, Bessarabia, Turkey, &c., is the true Rinderpest or Steppe Murrain of Russia.

6. That with the exception of a few places in the kingdom of Prussia and others in Moravia, near to the frontier of Galicia and Poland, the disease in its outbreaks of 1855, 1856, and 1857, did not extend to any country lying westward of a line drawn from Memel on the Baltic to Trieste on the Gulf of Venice.

7. That, speaking in general terms, Rinderpest has not existed in Central and Western Europe for a period of forty-two years; its great prevalence at that time being due to the war which was being then carried on between the different continental Kingdoms and States.

8. That all the facts connected with the history of its several outbreaks concur in proving that the malady does not spread from country to country as an ordinary epizootic. And that, if it were a disease exclusively belonging to this class, the sanitary measures which are had recourse to throughout Europe would be inefficient in preventing its extension, and consequently that in all probability we should long since have been both painfully and practically familiar with it in this country, as hundreds of our cattle would have succumbed to its destructive effects.

9. That it is one of the most infectious maladies of which we have any experience, and that it is capable of being conveyed from animal to animal by persons and various articles of clothing, &c., which have come in contact with the diseased.

10. That the ox tribe is alone susceptible to the disease; and that the morbific matter on which it depends lies dormant in the system for a period of not less than seven days, and occasionally, according to some continental authorities, as long as twenty days, before the symptoms declare themselves.

11. That an attack of the disease which has terminated favourably renders the animal insusceptible to a second action of the *materies morbi* which gives origin to the pest.

12. That the deaths often amount to 90 per cent.

13. That the malady is one in which the blood is early if not primarily affected; and that subsequently the mucous membranes throughout the entire body become the principal seat of the morbid changes.

14. That the symptoms are in general well marked and quite characteristic of the affection.

15. That all varieties of medical treatment which have as yet been tried have failed in curing the disease; the recoveries which take place having for the most part depended on the *vis medicatrix naturæ*.

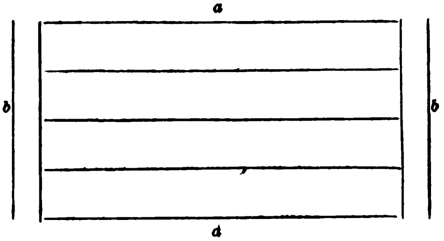
16. That no fear need be entertained that this destructive pest will reach our shores. Its present great distance from us would, of itself, afford a fair amount of security; but when we add to this that no cattle find their way from thence, directly or indirectly, to the English market, and also that in the event of the disease spreading from Galicia, it would have to break through hundreds of military *cordons*, one after the other, before it could possibly reach the *western side* of the German states; and, moreover, that for years past commerce has been unrestricted with regard to skins, hides, bones, &c., of cattle from Russia and elsewhere, all alarm, we believe, may cease with reference to its importation into the British Isles.

HALKETT'S GUIDEWAY STEAM AGRICULTURE.

Our agriculturists live in the days of innovations. Fast fading from the memory of our farmers—all *slow* as they are said by some to be, but fortunately *sure* withal—is the recollection of the good old times when processes, and the implements by which they were carried out, were handed down from one generation to another, resembling the laws of the Medes and Persians in this, that "they altered not." And, as the influence of those steady times is gradually losing its hold on the minds of our agriculturists as a body, their attention is directed ever and anon by a succession of proposed innovations, fast flowing in, one upon another, to the time coming—by some thought the "good," and by others (who see only evil in any change) ruefully ruminated upon—when innovations will be welcomed as the signs of a healthy progress; and not, as is too often the case now, met with the sneer of the incredulous, and the one-sided investigations of the prejudiced. Unpleasant, truly, is the position of the innovator. He is generally examined as to his purposes and intentions, as if these had for their aim the filching of men's wealth from them, and the subversion of good order and social morality. He is set up to be the fair mark of the carping cabalist, exposed to dull jokes (as if a joke could upset a theory, or be weighed as equal in value with a fact), to be sneered at as a dreamer, and perhaps to have his very sanity placed in doubt. Yet the world is hugely indebted to innovators. It is now reaping the fruits of the thought of schemers, such as Watt, Fulton, Stephenson, and Wheatstone. Sneered at as vain enthusiasts, or denounced as the robbers of the poor man's bread, we find these "innovations" on the practice of their day, unostentatiously yet powerfully at work, clothing the nations, ministering to our wants, and catering for our luxuries; bearing us to distant lands with amazing speed, against wind and wave; dashing with the fleetness of the race-horse through hill, and along dale; and bidding fair soon to realize the prophetic boast of the Spirit in the play, of "putting a girdle round the earth in forty minutes." Let us, then, treat innovators with all generosity, and canvass the merits of their innovations with all frankness and fairness. Let us view their proposals in the enlightened spirit of those who wished to draw information and derive knowledge from every source, treating none with scorn and indifference because it may present at the first blush features which shock our prejudices, or which run counter to our own knowledge, or supposed knowledge, of facts. It is at all times unsafe to judge by appearances; examination may discover features which were unrevealed to hasty glances. The lamp in the fairy tale looked doubtless a worthless thing; but the magician-merchant knew its worth, and invoked its power. The fabled philosopher's-stone clearly was not thought, by those seeking for it, to be a dazzling gem which, by its lustre would attract any eyes, and reveal its work to any finder; it was evidently a thing to be wearily looked for and closely examined. The glass that glitters in the sun-light is but worthless, after all, and poorly repays the labour of him who traverses fields and overcomes obstacles to gain it; the golden nugget, in its roughened matrix, looks like a lump of molten earth or stone, which may be trodden under-foot or cast aside as worthless. "Examine all things, try all things: hold fast that which is good"—not that which is "old," as some may read it—not that which is "new," as others may translate it; but that which is "good." And this good can only be ascertained by inquiry, by the examination, by the trial which the first part of the text commands.

These remarks, and the conclusions which may be deduced from them, are not, we conceive, inappropriate, in introducing to the notice of our readers a truly startling innovation in agriculture, the peculiar features of which, and their adaptability to practice, the agriculturist is called to examine and canvass. We have said that agriculturists live in the day of innovation; and in view of the probability—nay, the almost certainty—that innovations will increase, not decrease, in number, it behoves everyone to decide how and in what way those innovations shall be received and considered. Too long have agriculturists as a body laboured, and their reputation languished, under the charge, that, as compared with manufacturers and men of commerce, they are slow, and in all things opposed to change, even if that change bring with it improvement. Not here to enter upon the discussion of the question whether this charge be true or not, certain it is that if agriculturists wish "outsiders" to be of opinion that the charge can be answered in the negative, the discussion of "Innovations on Practice" *must* be conducted in a different spirit, and lead to more practical results than has been the "use and custom" in times gone by. Far be it from us to ignore the vast strides which agricultural progress has made during the last twenty-five years, or the wondrous aid which our mechanicians have lent to it in carrying out its various processes; neither do we join in the cry (because wholly false we deem it to be) that agriculture stands still, while manufactures and commerce flourish and spread their dominion wondrously; but what we wish to enforce on the minds of those who think we have arrived at, or at least pretty near to, the promised land of Perfection (not many of which class surely will be among the readers of this journal), that so far are we from this same perfection, that we are simply in a transition state; that we have, in fact, invoked—but not yet possessed ourselves of—that mighty power which has changed the face of commerce; and, further, that Progress does not mean (what some men evidently do think it does) that we are to go on, or up to, a certain point, and stop there; that the meaning of the term, if it has any meaning at all, is a going forward—a moving on; and that consequently it is difficult, if not impossible, for any one to set limits to this progression, and to say "Here it shall go, and no further!"—to change, in fact, the word, and say "Here, up to this point, it shall be progression; then, stoppage!"

Not longer to detain our readers, we hasten to explain the peculiarities of that innovation which forms the subject of this paper—an innovation so thorough in its character, and so subversive of established practice and preconceived notions, that it may well, as some may deem, be ushered in with those remarks which we have ventured above to address to our readers. Last year, at this very time and period, it was our privilege to explain to the readers of this journal another innovation in agricultural practice, and to deduce from it the probability that in process of time the farmer would be called upon to join the somewhat incongruous calling or trade of distiller to his own; and that on the ground of his being enabled thus to become a better farmer. Those who will please to turn to the Supplement of the *Mark Lane Express* of Monday evening, January 9th, 1857, will find, under the title "Agricultural Distilleries," our explanation of the innovation to which we refer. The innovation we have now to notice, in the features which it presents, is even more startling still, and calculated to give no small shock to time-honoured prejudices. With its introduction ceases the ploughboy's occupation; and from the plough-tall we take him to the platform, and transform him into an engine-driver, working his machine on a veritable railway. Oh! shades of our broad-bottomed ancestors! what next?—and next? But let us explain: Imagine the field to be cultivated, to be laid out with a series of permanent ways, or rails, thus—



placed at a distance from each other of some thirty or fifty feet. At right angles to those rails (*a a*), along the headlands separate railways (*b b*) are placed. Imagine, further, two side-frames, each supported by eight wheels of small diameter, to run on two contiguous rails; these frames to be connected by a platform stretching over the intermediate space between the rails, and supported by the side-frames. This platform, in its turn, supports two steam-engines; one at each end. These give motion, by means of suitable gearing and connecting rods, to the small wheels on which the side-frames are supported. The two steam-engines are coupled together, so that one end of the platform, or one of the side-frames, shall not progress at a quicker rate than the other; by this means the uniform progression in the same line of motion of the platform along the rails is insured. To the under-side of the platform imagine a series of plough-bodies to be suspended, and to be adjusted so that, when moved along the space of ground between the rails, they shall cut furrow-slices of a determinate depth and breadth. Suppose the frame or platform, with its suspended ploughs—in number equal to a complete working of the soil the full allowable breadth between the rails—to be near the headland, and on the near set of rails; the engines are set in operation; the wheels of the side-frames revolve, and the frame progresses up the field, at a rate determined on, until it reaches the opposite headland. The land between the rails over which the frame has traversed will thus be ploughed. The shifting of the frame or platform, with its suspended ploughs, to the next set of rails, is now to be performed. On the headland railway a low traversing frame—similar to that employed in railways for shifting carriages from one line to another—runs at such a level that the platform can be run off to a set of rails placed on it. The traversing-frame is then moved along the headland-railway to a point opposite the next set of rails on which the platform, with its ploughs, is required to run. By a very simple arrangement, the set of ploughs which were first in use are taken out of contact with the soil, and another set, working the contrary way, placed in order. The frame is now moved along the rails, and the ground between them ploughed as before. These operations are gone through till the spaces of ground between the whole sets of rails are all ploughed. One point in the arrangement of operations here performed will obviously strike the reader at this stage of our inquiry, namely, from the parallelism of the rails, and the ease with which, mechanically speaking, exactly similar adjustments of succeeding and diverse implements can be made to the platform, a degree of precision hitherto unattainable in actual culture can be insured. Thus, by the apparatus, the seed can be sown by means of the ordinary drill mechanism, and the spaces between the rising plants hoed by hoes or blades capable of most accurate adjustment to the frame. On this point the inventor states: "I have drilled by the steam-machinery rows of plants, and, when they have come up, I have hoed them repeatedly by the same steam-machine with the greatest perfection, and at all stages of their growth. In fact," he continues, "I have placed" (note that he states that he *has* done it, not that he *thinks* he *can* do it—a distinction worthy of attention here) "the blades of the hoes on each side of the rows, so near them as to cut within half an inch distance from the stalks without doing any injury to a single plant as the machine hoed them. I may mention," he goes on to say—and what he is about to say is worthy of saying, and of course of hearing—"that I have frequently placed upright in the ground two small sticks (two pencils) at a distance from each other of *one inch*, and, having fixed a small stirrer, or tine, propelled it at full speed of engine, cutting the ground between the sticks without on any one occasion disturbing either of them. So much for the *facts* proving the precision of the operation of the arrangements adopted by the inventor.

Another feature of the apparatus, which will be obvious to the reader, is that all poaching or padding of the soil—an evil inherent in all the methods of culture at present in ordinary use—is avoided; in fact, nothing comes in contact with the soil under culture but the implements and machines which are to effect that culture. But more of this important point hereafter.

Having now given a general notion of the peculiarities of the "Guideway Steam Agriculture," we proceed to enter more fully into details. In doing so, we shall divide our remarks into four classes: 1, Construction; 2, Practice; 3, Cost; and 4, Results cultural.

1. Construction. Under this head, the point which first claims our attention is the "permanent way." This may be constructed in one of two ways—first, by driving piles into the ground in the line of intended rails, these supporting a continuous top-rail, or beam, on which the rails are laid; or second—which is the method adopted in practice—by digging a trench on the line of rails, and forming a foundation, or ballast, after the manner of ordinary railways, and laying the rails on this. The rail used is not flat on its upper surface, like the ordinary rail of our railways, but angular in section; this gives a sufficiently strong yet cheaper rail than the ordinary one. The section being angular, the tires of the wheels of the moveable side-frames supporting the main platform have angular grooves, into which fits the apex of the angular rail. The rail does not rest on wooden sleepers laid on the ballast, but upon angular hollow bricks which act as the sleepers. The space taken up by the rails and the ballast is, obviously, so much taken off from the cultivable soil of the farm. This loss, however, is comparatively insignificant in amount, being calculated at 2s. per acre only. But, as the distance between each pair of rails is 30 feet—easily increasable to 50—the space of land lost by the rails and their ballast is much less than that in ordinary cases with the open furrows between the stetches. Mr. Halkett calculates that with a gauge of fifty feet, and a width of foundation for the rail of 2½ feet, 1-20th of the land is taken up by the rails. One set of driving-wheels, attached to one of the side-frames, have a lateral play or adjustment given to them on their axles; this arrangement meeting any deviation from the exact parallelism of the rails, or alteration of the width of the gauge, which may happen through various causes. This play or traverse of the one set of wheels is also useful in adjusting the implements which, in operation, succeed one another. Thus the drill-spouts or seed-depositors being made to travel at a regulated distance from the rails, the succeeding implements, the hoes, can be adjusted so as to travel in lines exactly parallel with the lines of motion of the drills, and, consequently, between the rows of growing crops. As no transverse ties or sleepers can be used, as in ordinary railways, to preserve the width of "gauge," this has been considered by some as militating against the utility of the system; it being argued that one of the practical difficulties in the maintenance of the permanent way of railways is keeping intact the width of gauge. But it should be remembered, on the other hand, that there is a vast difference between the speed of the railway locomotive and that of the travelling platform of Mr. Halkett, that of the former being up to as high a velocity as 50 and 60 miles per hour, while that of the latter is only about 2½ miles per hour. The succession of impacts given to the rail by the passage of a train at a high speed over them tends rapidly to destroy the integrity of the railway. In Mr. Halkett's system no inconvenience has arisen in practice from the want of any method to preserve the gauge of the rails. In view of the cultivation of the soil being carried on quite up to the line of ballast which supports the rails, it has been objected that the ballast will have a tendency to give way laterally, from want of solid earth on each side to support it. In answer to this, Mr. Halkett states that he does not cultivate close up to the rails to an equal depth with the rest of the space, but gradually slopes the cultivated part outwards from each side; thus leaving a considerable width of solid ground against the lower part of the ballast. Moreover, the slow rate of speed at which the platform travels is not found, in practice, to injure the ballasting. Even in cases where the soil may be ploughed quite up to the line of ballast, and to the ordinary depth, we do not anticipate that its lateral displacement will amount to much: besides, this lateral displacement can be easily obviated by simple contrivances. Again, it is to be remembered that the pressure of the whole apparatus is distributed over a large amount of surface by the use of numerous wheels—eight in number—on which each side-framing supporting the main platform rests; just as we find that a beam, which has the weight which it has to support distributed over the whole of its surface, can sustain a load double in amount of a beam which has its load placed on, or hanging from, the centre.

The main platform is constructed of timber framing, and in cross-section is exactly like a trussed roof, with the tie-beam, rafters, king post, or tie-rod, and struts, or braces. The tie beams or cross beams are not solid, but are made of two boards or planks placed on edge, and secured together by blocks or cross pieces; a horizontal board is placed at the lower part to resist the lateral strain to which the girders or beams are subjected. By this arrangement the necessary strength is ensured, with considerable lightness of material. We conceive that the hollow wrought-iron girder system could be adapted with success to the construction of a platform of wider space than any yet contemplated by Mr. Halkett. There is no engineering difficulty in the way to prevent a space of much above fifty feet being obtained. By the judicious use of wrought-iron a platform of great space, with all the rigidity required and of great lightness, could be constructed. But to return: The whole of the cross girders or tie beams are secured together by transverse bearers, which run in a direction parallel to the rails, and are further strengthened by light wrought-iron diagonal tie rods or stays, which stretch from corner to corner of the under side of the platform. The ends of the planks forming the sides of the girders or main tie-beams of the platform are secured to vertical uprights, which afford bearings for the running or driving wheels already alluded to. The bearings of these wheels are not fixed to those uprights, but are allowed to slide freely up and down in guides formed between the sides of the uprights; at the upper part of these guides strong springs, all of equal strength, are placed, to offer resistance to the bearing of the wheels when having a tendency to move too far upwards. By this arrangement the whole weight of the platform is transferred to these wheels through the medium of the springs. As before stated, these springs must be all of equal strength, so that each wheel may bear as nearly as possible the same amount of weight while resting on a level surface, and they must also possess a considerable amount of elasticity, to enable the several wheels to pass over any undulations of the rails without transferring too much weight from some of the wheels to the others. A maintenance of a uniform distribution of the whole weight of the platform on the wheels is what is aimed at in this arrangement.

At each end of the platform a steam-engine is placed: by preference the patentee employs the portable form, as engines of this class can be easily removed from one platform to another, and used for other purposes, as for thrashing, &c. The two engines are coupled together, the cranks of the main driving shafts being at right angles to each other; so that while one is at its dead points, the other shall be receiving the full impulse of the engine. The cranks are not on the same shaft, but are connected together by wheel gearing, and by a transverse or cross shaft, which stretches from one side of the platform to the other, and is supported on suitable bearings, bolted to the platform. To each end of this shaft a spur wheel is provided, gearing with a spur wheel of equal size, keyed on to the end of the crank shaft of the engine. The speed of the cross shaft is thus equal to that of the engine shaft. To reduce the speed of the cross shaft change wheels are used; the spur wheel on the cross shaft being thrown out of gear with the spur wheel on the crank shaft of the engine by means of a sliding clutch; another spur wheel on the cross shaft being at the same time thrown into gear with a pinion, or wheel of less diameter, fixed on the crank shaft of the steam-engine. The two engines are thus coupled together, and the motion of both so regulated that one side of the platform cannot advance quicker than the other.

To the outer extremities of the axles of the driving wheels, on which the platform rests, small cranks are keyed on, and which have a limited motion up and down, along with the bearings which have already been described. The crank pins of these cranks take into, or play in vertical slots, made in a horizontal, light, open framework, serving as a connecting-rod to connect all the cranks together. The extremities of these frameworks or connecting-rods are jointed to the crank pins of cranks, the shafts of which are supported in suitable bearings at the end of the timbers or planks of the platform. To the same crank pins the extremities of four connecting-rods—two at each end of the platform—are jointed; these are carried diagonally upwards, and jointed at their upper extremities to the crank pins of cranks which are keyed on at right angles to the ends of the cross shaft, which receives its motion from the engine in the manner already described.

Each wheel is thus made a driving-wheel, being acted on directly by the horizontal frame or connecting-rod, which receives its motion from the engine through the medium of the two connecting-rods, one at each end, jointed at their upper ends to the crank pins of the cranks on the cross shaft. The bite on the rails obtained by this arrangement is such that the engine can propel the platform up inclines of 1 in 15 with comparative ease, and without any momentum. Such is a brief outline of the peculiarities of construction of the mechanism of the new system—we now enter on the consideration of the second head, "practice."

And, first, as to ploughing. The method by which the ploughs are raised and lowered, that is, put in and taken of work according to the direction in which the main platform may be proceeding, is very simple. Each plough body is attached to the end of a long lever, the opposite end of which is jointed to the end of a bolt, firmly connected with the main platform. These points of suspension are capable of adjustment at any point of the platform. To the end of the lever, at which the plough body is attached, a curved guide is fixed; in the inner side of this bar, and towards its upper extremity several teeth are provided; the bar, in fact, forms a curved rack, the teeth of which enter into those of a small pinion, the axis of which revolves in bearings placed on the upper side of the main platform. As the rack is raised by the revolution of this pinion, the end of the lever, to which the lower or opposite end of the rack is fixed, is raised also, and with it the plough body, which it carries. A series of levers, with their racks, are placed parallel to one another, and to the rails on which the platform traverses. The levers bearing the corresponding set of ploughs, with their mould-boards pointing in an opposite direction to the mould-boards of the other set, are swung the opposite way; so that the curved racks of each set of plough levers are at opposite sides of the platform. When arranged for ploughing, one set of curved racks are depressed to their lowest point, the ploughs being in contact with the soil; the other set being raised to their highest elevation, the ploughs being suspended in the air. The pinions which gear into the segmental racks that raise or depress the plough bodies are keyed on to two shafts, which stretch across the full breadth of the platform, and revolve in suitable bearings. To the ends of the shafts cross handles are fixed, by means of which the attendants on the platform can work the pinions, raising or depressing the plough as required.

In ploughing by the implements as thus arranged and under control, Mr. Halket states that there is no practical limit to the depth of soil inverted. Neither, from the peculiar nature of the plough body used, is the hard crust or sole—inherent in the action of the ordinary plough—obtained. By his method of operation he succeeds in getting a stirred soil to the depth of twenty-five inches. On this point, he says: "I have first drawn six ploughs, cutting six furrows simultaneously to a depth of five inches; passed over again to a further depth of five inches with the ploughs; and at fifteen inches below, in the subsoil of a hard yellow clay, drawn an anchor with a palm of nine inches width through the subsoil; thus ploughing and breaking up the ground to a depth of twenty-five inches." Although—as we understand—Mr. Halkett does not advocate the use of a rotary cultivator in the first instance, yet he has succeeded in obtaining some remarkable results in reducing obdurate clay to a state of amazingly fine tilth by using a rotary implement after the plough has broken up the land. The implement used resembles in character the well-known Norwegian harrow. Imagine this revolving in contact with the soil previously acted on by the plough; dashing the clods and lumps of clay against an inclined board, forming part of the casing in which rotary implements work, and which is dragged along by the main platform, which fall back again to receive the action of the revolving tines, till finally the couch and weeds are deposited apart. on one side, to be easily taken up and laid aside, to be burned, or otherwise disposed of; and the soil, in a state of fine tilth, deposited on the other. We saw, at the late meeting, the clay in its original condition, which gave apparently but little hope to any reducing system; and also its condition after it had been subjected to the action of the rotary cultivator, with the collection of couch which had been extracted from it; and certainly the results obtained were very satisfactory. All the implements and machines in use on a well-conducted farm can be worked by means of the platform with as much facility as the ploughs. Mr. Halkett has used, we believe, harrows, clod-crushers, hoes, drills, and has even reaped with the machine. Another novel feature in the system is what is called "underground watering:" this consists in "supplying to the roots of the crops, while at the same time the ground is stirred and hoed, water (or liquid manure), by drawing hollow bars between the rows of the plants, at the bottom of which the liquid escapes at any desired depth. By this means the fluid is economised on account of the evaporation from the surface being prevented; it does not cake the soil, which agriculturists object to as the result of the usual practice of watering, and it does not draw the roots to the surface in search of the moisture, afterwards to be injured by the parching of the ground."

We have now to consider, under the third division of our subject, the cost of the apparatus. The cost of putting the machine in operation on a farm would be about £20 per acre for the rails and £3 for the machinery; it is calculated, says Mr. Halket, to last as long as a horse, and may therefore be put down at 21 years' purchase. The following table shows the cost of the rails, and we may here state that Mr. Halkett is considered to have given a very liberal estimate of the cost of all the items, so that there is every probability of the cost per acre being reduced below that mentioned in the table.

Cost per acre of guideway upon burnt clay ballast, in which angle iron and angle tram bricks are used.

800 feet of tram brick	£3	6	4
Laying down and providing ballast and levelling for tram bricks	3	10	0
Angle iron, 1½ lb. to the foot, and 14*l*. per ton ..	7	17	0
Bolts	0	12	0
Fitting fish joints	0	10	0
Fishing joints	0	10	0
Punching holes in iron	0	7	0
	£16	12	4
Contingencies at 10 per cent.	1	13	0
Cost per acre......	£18	5	4

We now come to the consideration of the last division of our subject, the "results cultural," or as Mr. Halkett, at the meeting at the Freemasons' Tavern, on Thursday the 11th December, termed it, the "pith of the matter—the pounds, shillings, and pence part of the question." In proving the "large profits to be derived by this system of cultivation," Mr. Halkett, at the meeting already referred to, stated that he based his calculation on the following principles:—

> "Spade labour is often used to cultivate the same crops as those farmed by horses. Spade labour is far more costly than horse farming; and being more costly, it must also be richer in produce. That it is so is universally admitted to be true, and, I may also add, with the same amount of manure in both cases. Now my system of cultivation is performed, at a cost including the interest for capital to pay for the rails, and depreciation and wear and tear, together with all charges for labour, while the work performed is equal in amount and depth of tillage to common farming, at a smaller annual charge than is now done by horses; while, if I increase the depth of ploughing, and the number of hoeings, stirrings, &c., so that the cost of my system is raised to that of common farming, while the work done is equal to spade cultivation, then all that is produced in extra crops is pure gain to a very considerable amount. If I take the usual computations of horse field-work, I find that the average is from £2 in country districts to £3 near towns: and if I take spade labour I find that it varies from £5 to £6., in fact to £3 per acre above the cost of horse farming, but the produce is at least worth £4 per acre more."

In corroboration of these views Mr. Halkett gives the following table from "Morton's Cyclopædia of Agriculture."

Table in article "Capital."

Acres.	Rent and Taxes.	Labour per acre.			Gross produce per acre.			Remarks.
	s.	£	s.	d.	£	s.	d.	Rotation—
240	40	2	0	0	7	18	0	Wheat, carrots, or potatoes, green crops for cattle.
20 spade husbandry .	40	5	10	0	12	7	0	
Difference		3	10	0	4	9	0	

Other tables and evidence are given by Mr. Halket, which space does not allow us here to insert; but all corroborative of this, that the cost of spade husbandry per acre may be set down at between £5 and £6.

In proof of the assertion that by his system he can plough hard land at 1s. 7d. per acre, and light soil at 1s. 3d., Mr. Halkett gives the following tables:—

STEAM-PLOUGHING AND HORSE-PLOUGHING

Compared theoretically, ploughing in both cases at the rate of an acre and one-fifth per hour.

STEAM-PLOUGHING.

40 horse-power
× 8 lbs. of coal per hour

320
× 8 hours

	s.	d.
2560 lbs., or 23 cwt., at 1s. per cwt.	23	0
Oil, &c.	2	
Men { 1	5	0
Men { 1	3	0
	33	0

33s. for 8 hours and for 24 acres = 1s. 5d. per acre.
Or 44s. 6d. for 12 hours and for 36 acres = 1s. 3d. per acre.

PLOUGHING BY HORSES.

40 horses, the day's keep at 3s.	120s.
20 men, at 2s.	40s.
	160s.

160s. for 8 hours and for 24 acres = 6s. 8d. per acre.

COST OF PLOUGHING BY ACTUAL TEST.
Furrows 5 inches by 10 inches.

Engines.	Steam per inch.	Revolutions.	Platform Travelling.	Drawing
Garrett's 6 h. p.	50 lbs.	110	2280 feet	Ploughs.
Barrett & Exall's 4 h. p..	48 lbs.	110	per hour	12

This was upon hard ground trodden on by the workmen for a year, and equals 5.7 acres per 12 hours, from which subtract one-tenth for shifting at headlands, gives 5.2 acres per day. Then 5.2 acres (amount ploughed by 10 horse-power) × 4 = 20.8 acres (say 21 acres) for a 40-horse power locomotive platform. Therefore 33s. (the cost of eight hours' ploughing by steam as shown above) divided by 21 acres, is equal to 1s. 7d. per acre, the cost of ploughing. Upon ground that has been ploughed some period before, but which had been trodden and rammed down, I have drawn 12 ploughs at the same speed, with a pressure of 32 lbs. in the 6-horse power, and 35 lbs. in the 4-horse power. This makes the ploughing much less than in the hard-ground example: it makes it 1s. 3d. per acre; or the amount could be increased per day of ploughing. The statement, therefore, of cost, at 1s. 7d. per acre, and 24 acres per day, may be considered a fair average.

It will be perceived that Mr. Halkett estimates the cost of coals at 20s. per ton; but it is well known that in many districts this estimate will be too high. In Lincolnshire coal is obtained for engine-purposes at a cost far, very far below this. It certainly cannot be objected to Mr. Halkett's estimates that they are too low; he in fact scarcely gives his own invention fair-play in this respect.

The following is a statement of the cost of operation per acre for a farm of 1,000 acres:—

	s.	d.
Ploughing 5 in. by 10 in.-furrows	1	7
Deep cultivation to the depth of 25 inches	12	0
Scarifying, grubbing, &c.	0	8
Harrowing, clod-crushing, rolling	0	5
Hoeing (150 acres could be done per day)	0	3
Drilling or dibbling seed	0	5
Reaping (cutting and delivering) at 60 acres per day .	0	8
Underground watering crops, at the rate of 3,000 gallons per acre, and 60 acres per day or night, or double this quantity if done by night and day ..	1	0
Surface-watering (with hoes following)	1	2
Carriage of manures on to and distributed over land, and of crops carried off, also carriage of marl, clay, sand, &c., 0½d. per ton per mile.		
The amount that can be carted at a time, for either water or manures, &c, 70 tons.		

With reference to the important point of carting-off the produce of the farm, Mr. Mechi, who took the chair at the meeting we have alluded to, spoke as follows:—

"To-day I went to the Polytechnic Institution, and heard Mr. Pepper lecture on this very subject. There were two trucks, each of which contained a ton-and-a-half of mangel-wurzel; and I saw two men move the three tons with perfect ease; and they would have had no trouble in passing from one end of London to the other, provided the roads were level. Now, I have had carted off many hundred tons of mangel-wurzel within the last month, and I find that on a clay-farm, late in October, two horses could only carry off at a rate which would require twelve horses to carry off eight tons; and the reason of that was nothing else than the difference in friction."

It is evident that this system of cultivation will work under most advantageous circumstances, where large tracts of lands can be obtained to operate upon. The question of the cost of its adoption—as much, as Mr. Mechi remarks, as the fee-simple of the land—is not the one which is surrounded with difficulties. It is not What does a thing cost? but, What per-centage will it pay? that is the question, the importance of which no one knows better than our manufacturers, who have certainly done more in the way of putting down costly mechanism than any other class. They stand alone in this respect. The real difficulty in the way of a wide extension of this system, is getting large farms to operate upon—apart, of course, from all questions of mechanical and cultural fitness. Mr. C. W. Hoskyns, at the meeting to which we have already so frequently alluded, pointedly drew attention to this. In stating that Mr. Halkett would have great impediments to encounter in carrying out his system, he remarked that one of these would arise "from the difficulties which clog the advance of any agricultural system on a gigantic scale, where large tracts of land are necessary to be purchased. The laws of settlement and entail offer great objections, and also the enormous expense and delay in transferring land. The first objection that occurred to me was the difficulty that awaited him in getting farms on such a scale as to be able to realize his mode of cultivation, supposing he had mastered all mechanical and engineering difficulties."

But our lessening space reminds us that we must draw our paper to a conclusion as rapidly as possible; we therefore hasten to offer an abstract of the advantages obtained by this system of cultivation, as stated by the inventor:

1. The whole weight employed in culture being taken off the land, the operations can be carried on in all weathers, and in any condition of the soil.
2. The land is left in a state of lightness not attainable where more horses and implements press upon while it cultivating.
3. Consecutive ploughing in exactly the same lines being easily obtainable, a greater depth of soil stirred than is usually arrived at can be insured.
4. The bringing up of fresh soil for intermixture with the top-soil in any desired proportion.
5. Facilities for carrying on manure, and depositing it on the land.
6. Facilities also for carting off produce.
7. Also for carrying soil of different qualities to intermix with the soil of the farm.
8. Precision of operation [this we have already enlarged upon].
9. The operation can be carried on by night and day.

Whatever may be the opinions of some as to the soundness of these presumed or stated advantages, it certainly is the case that many are disposed to look upon this system of Mr. Halkett's as a move in the right, the philosophical direction. It is fast becoming an established opinion amongst engineers and mechanicians, that before the full advantage of the application of steam-power to the purposes of cultivation can be obtained, there must be an adaptation of the land to the peculiar features of the new power to be employed. If local or other peculiarities prevent the free and economical action of the power of steam, those peculiarities must be got rid of before full satisfaction can be obtained. And in the long run it will be found a cheaper method to get rid of, for once and all, those peculiarities which prevent the free action of the machine, than to adapt self-adjusting or other arrangements to the mechanism, by which it can be enabled to stop itself, till the peculiarities which impede its free action are got out of the way. Thus we can conceive of a plough being dragged by the steady power of steam across a field, and which has a self-adjusting mechanism given to it, by which it either stops its own progress if coming in contact with a boulder, or else is enabled to slide over it without damage. But the philosophical, and in the long run the cheapest, method of procedure, is to get rid of the stone altogether. Root it out: take it away: it is only an obstacle, and an ever-recurring one if allowed to remain. Our cotton manufacturers know the value of this method of working: it is one of the secrets of their success. They grudge no outlay in mechanism and processes to perfect the material for the action of the higher and finishing class of machines. Why should not our agriculturists do the same thing, if they are anxious, as we know they are, to avail themselves of a power which is most undoubtedly capable of untiringly and economically doing the work, or a large proportion of it at least, of our farms? The whole question is one of cost only, not of mechanical or cultural difficulty. If eminent machinists say that with properly-adapted land they can and will construct machines which shall do the utmost amount of work, and that far beyond the realized produce of the present system, then the first thing clearly which the farmer has to do, is to begin this work of adaptation, that is if he thinks it worth the cost. A calm view of the whole circumstances of the case tends to show that nothing perhaps has prevented the adaptation to farm purposes of high-class machines, worked by steam-power, so much as the obstacles thrown in the way by the peculiar features of the land on which these machines have to operate. We do not ignore the fact that the soils possess features infinitely more crude, unequal, and varying than the materials on which high-class manufacturing mechanism has to operate; but there is little doubt that these peculiarities can be greatly obviated in many instances, and totally removed in others. When many of our engineers—the gifted William Fairbairn at their head—hold opinions such as those we have endeavoured to state, the time is near at hand when our agriculturists will see, with them, the necessity of "beginning at the beginning." It should always be remembered that the adaptation of a new power involves new circumstances of action. The finest locomotive that ever a Stephenson or a Hawthorne made, could creep but quietly on our best-paved road; but give it the iron rail, and lo! the lightning speed.

It is just when viewed in this way that the system of steam-cultivation invented by Mr. Halkett presents considerable promise; so much so, that it is deserving of the most searching inquiry by all those interested in the progress of agriculture. It is just because that, in using a new power, Mr. Halkett has carried out a new method of preparing his land, and that too a method which experience shows clearly enough—the experience of our railways—is well adapted to the new power. In this mutual adaptation of the power and the land lies the secret of the *complete novelty* of the system in an agricultural point of view; and is that, moreover, which presents a species of fitness and unity which goes somewhat towards satisfying the mechanical requirements of the case.

As to the way in which it satisfies, or is likely to satisfy, the agricultural requirements, we cannot do better than quote Mr. Hoskyns's remarks on the system. We can bring forward no better authority:

"Any gentleman unacquainted with the extraordinary difficulties of a clay soil, cannot have the least idea of the benefits to be derived from this mode of cultivation, which will perform the process of culture without having the animals poaching, as we call it, the ground; that is, treading and leaving the marks of 16 iron-shod feet on the soil as the fulcrum of power on the land. As far, therefore, as it is possible to look at Mr. Halket's plan generally, it appears to me that two great advantages are gained by it. The first is the immense saving of power by means of the rail. I do not here enter into any question of deflection that may be supposed to exist, as that is only a question of detail, which by no means should stand in the way of ultimate success. The first great advantage, I say, is the immense gain of having an iron track to go upon, instead of the moist and sticky earth. Here he has always a clean road, and one on which I can see the greatest amount of power is to be obtained at the least expense. The second advantage is to be able to cultivate clay soil without any weight whatever attached to the machine that cultivates or the power that draws the machine; that is to say, that if it is for ploughing, the plough is to go through the ground without any pressure on the soil. In the act of lifting there is a degree of pressure by the tugging irregular action of the horses, because we all know that the tug is very unequal. With mechanical action, even when applied to ploughing, we know that the results are far better; but I say that nothing can be worse than the action of a plough with four horses working on the land, as we see every day in winter. The question, therefore, is the successful solution of the problem of the cultivation of clay soils without having any horses or heavy machines pressing into the soil during cultivation. When we have accomplished that, we shall have done more to advance the value of the clay soils of this country than is done for light soils by the introduction of machinery. Clay soil is more valuable, as it contains a far greater quantity of food of plants in a form more difficult to be taken away either by moisture or the heat of the sun. Then we shall be able to make twelve months' soils, instead of what the farmers call six month's soils."

In offering our own remarks on this invention, we deem it right to state that they are not given in the spirit of the partizan—they are thoroughly independent of all circumstances save those connected with the mechanical and cultural features of the invention. It is alone with these features we have to do—any other are completely and altogether indifferent to us. It is our earnest desire to give a fair field to all, and to see all inventions considered with candour and fairness, their good things cordially acknowledged, their faults generously pointed out, remembering always the pregnant words of Bacon, "As the birth of living creatures at first are ill-shapen, so are all innovations which are the birth of time." He were a poor soul indeed who contemned the child because it possessed not the features nor displayed the vigour of the man. How often as wise a thing is done, in judging of the merits of an innovation, let the records of the experience of our poor patient inventors tell.

R. S. B.

ANNUAL REPORT OF THE LINSEED AND OILCAKE TRADE.

Sir,—We have again the pleasure to furnish you with our annual circular, and can but regret that the forebodings expressed at the beginning of the year just passed should have been realized even to a much greater extent than we could then have considered possible. The general inflation of trade, however, was not without its effect on the articles in which we are interested, and the speculations of the spring and commercial collapse of the autumn will render the history of the year 1857 a most memorable one, and in no trades more so than in seed crushing. From the time of the publication of our last circular until now, the trade was never less remunerative, but it is to be hoped the lower range of prices now current will place it in a healthier condition, and render business, both to importer and crusher, more profitable than of late. The last three months must have shown how inherently sound the trade was, and we trust that the caution exhibited by the crushers previous to, and during the present crisis, will carry them through the season at a less loss than might have been feared from the panic occurring just at a time when, of all others, they were likely to have been overtaken with heavy stocks.

We have again returned to Black Sea seed as the standard of prices, the import of that description being again greatly in excess of all other sorts.

Linseed was worth 63s. in January last, and the expected short supply gave the market an upward tendency, and it was daily in holders' favour, so that before the end of that month 66s. was currently paid for parcels on the spot; and an advance of 1s. to 2s. per qr. obtained for cargoes on the way. February marked the highest prices of the year, 70s. 6d. having been paid for Odessa, and as high as 73s. for Bombay. At this period also some of the importers took advantage of the buoyant state of the market on the spot, to place seed for summer shipment, and several speculative purchases for shipment during the season, from the Azov, were made at 64s. to 65s. In March, notwithstanding stocks were very light, the feeling was strong that prices were too high, and purchases were made on the smallest possible scale, so that the price on the spot again fell to 66s.; and in April a further decline of 3s. per qr. was realised. In May, stocks had become so reduced, a recovery to 65s. took place, and some further very considerable sales were made of seed for shipment at about same price. Early in June we were flat at 64s., but at the end of the month had again improved to 66s., although the high price rendered business very difficult, crushers fearing to accumulate stocks at such unusually high rates. During this month, also, a circumstance occurred, which exercised a marked influence on the prospective bearings of the trade. We have named that, during the course of the previous four months, a large quantity of seed had been sold (chiefly to speculators) for summer shipment, from the Azov; and at about this time, the prevailing drought in the south of Russia rendered it probable that the greater portion of it would be detained until another season, owing to want of water to float the loaded barks down the rivers to the various shipping ports. The leading sellers, therefore, quietly covered in their contracts; and the fact afterwards being made public, crushers also became anxious as to their future supplies, and bought freely of such descriptions as offered the greatest inducement to purchase. It turned out, after all, that means were found to convey the seed overland, and merchants and crushers were alike caught at high prices, and, eventually, heavy losses entailed, which would not have happened but for this accidental occurrence. In July, the market was steady, at about 66s., with stocks in the smallest possible compass, and, but for the unlooked-for import of oil from Hamburg (causing the closing of the mills in the face of so heavy a loss in working), we should probably have had a much higher range of quotations on the spot, and, in anticipation of the then expected short supplies, for shipment also. In August, some of the early speculative purchases arrived at Falmouth, and, not finding a ready market, prices receded to 64s.; but the decline was recovered by the end of the month again. During September, 66s. remained a current price, and the prospects of both oil and cake being encouraging, some further speculative forward purchases were made as high as 67s. and 68s. In October, the pressure for money began to tell, and, notwithstanding the unprecedented support given to the market by holders warehousing nearly every cargo that came to hand, the downward movement could not be checked, and 63s. was an outside figure before the month closed. The incidents of the last two months must be so painfully fresh in the recollection of us all, that we need scarcely recapitulate them. 60s. was November's earliest quotation, and a decline of about 2s. per week followed, the market leaving off very dull at 52s. Last month a further fall occurred to 49s. to 48s., and the unexpectedly heavy arrivals from all quarters (including several reshipments of East India seed from the United States), combined with the want of facilities in money matters, would probably have caused a greater decline, but that holders, finding the utter impossibility of selling, resigned themselves to the force of circumstances, and an unusual quantity therefore has been housed to await a better demand. This has shown itself the last two or three days, and the tone of the market is stronger, 50s. being now the nearest value.

The crushing trade has been uniformly bad throughout the year—prices having been kept up beyond their natural level by continual speculative operations, and the demand for oil and cake not keeping pace with these, the result to the crusher must contrast very unfavourably with the past three or four years. We hope, however, we have less discouraging prospects for remainder of the season than at same period last year, for we have ample stocks afloat, and in granary. We may likewise expect full supplies from the East Indies; the late utter prostration of American credit probably causing (for a time) a stoppage of all shipments thence; besides the United States sparing us some of the large quantity they have still on the way and in stock, and which owing to their present monetary derangements, they are prevented using.

As regards the season 1858-1859 it is quite impossible to form an opinion before we are out of the present crisis; our panic cannot be without its effect on the producing countries, and we think we may reasonably look for a low range of prices for some time to come. The Baltic seed is highly spoken of as to quality, and fair in quantity. Archangel is not so well harvested this season. The crop in the south of Russia is reported short; it generally is, and little dependance can be placed on the reports thence. We presume the means of information must be very scanty, for we were led to believe the last year's crop would be under 200,000 qrs., whereas it has turned out over 500,000 qrs. From Bombay we may again look for an increased quantity; but the aggregate shipments from Calcutta will probably be short of last season, owing to the unhappy disturbances existing in the surrounding districts. At the same time, however, we shall have a much greater supply sent to this market than at the corresponding periods of the last two years, owing to the temporary cessation of the business relations between the East Indies and America.

The quality of the Black Sea seed has been most unsatisfactory in the Azov districts, apparently from a bad harvesting season originally, and subsequently owing to a large portion of it having been transferred from the barks and conveyed overland to its port of shipment, thereby exposing it to the risks of weather, &c. Some of the Odessa shipments really did not deserve the name of Linseed; but the disgraceful practice of admixture has at length reached such a pitch as must inevitably put a stop to it altogether, and the late combination amongst the crushers to alter the existing "usual conditions," on forward contracts, will (if energetically followed up and acted upon) in future put the trade on a more satisfactory footing in this respect. Archangel and all the Baltic seeds have unlike been unsatisfactory; they were both ill-grown and badly harvested: the late war had probably a good deal to do in bringing about this result, and its recurrence from such a cause is never likely, we hope, to happen again. Bombay seed was hardly so good as in former seasons. The very small quantity of Calcutta which came to the United Kingdom was again rather better than that of the previous two or three years' import.

In presenting you with the usual statistical account of imports and stocks, we cannot help remarking how widely different they prove to most of the calculations entered upon during the summer. We were told the total import was to be less than 800,000 qrs., and that by this time linseed would be nearly exhausted; whereas we find, on reference to our previous circulars, that the quantities warehoused, and known to be on the way, are more than double those of any previous season; that is to say, more by about 200,000 qrs.

In public warehouses here the stock amounts to 88,000 qrs., namely, 42,000 Black Sea, 24,000 East India, 11,500 Petersburg, 5,000 Archangel, and 5,500 sundries. At Hull there is 190,000 qrs., and at Liverpool 30,000 qrs. Afloat we have 230,000 qrs.; say 150,000 Black Sea and Azov, 50,000 Calcutta, 10,000 Bombay, and 15,000 Alexandria, Danube, New York, and sundries.

The import into London is again short of the two previous years. The aggregate into the United Kingdom will not be so great as 1856, but it will probably be in excess of any other previous year. The official returns of the several years have been as under:—

1841	363,461 qrs.	1850	608,984 qrs.
1842	367,700	1851	630,471
1843	470,539	1852	799,402
1844	616,947	1853	1,035,835
1845	656,793	1854	828,513
1846	506,141	1855	756,950
1847	439,512	1856	1,180,179
1848	799,650	1857	about 1,050,000
1849	626,495		

The imports of the working season, that is to say, 1st July to 30th June, were as follows, namely:

1848 to 1852	700,000 qrs.
1849 „ 1850	600,000 „
1852 „ 1853	825,000 „
1853 „ 1854	1,030,000 „
1854 „ 1855	1,006,000 „
1855 „ 1856	644,000 „
1856 „ 1857	1,092,047 „
1857 „ 1858 will probably be rather in excess of that quantity.	

60,000 qrs. Bombay, 40,000 Calcutta, 80,000 Black Sea and Mediterranean, 20,000 Baltic, 10,000 Archangel, 5,000 Alexandria, 13,000 American transhipments and sundries, were the quantities reported at the London Custom House. The re-export was again light, and consisted of about 30,000 qrs., against 45,000 qrs. in 1856, and 130,000 qrs. in 1855.

The total supplies into United Kingdom again exhibit a curious alteration in the description of Seed imported; the great falling-off has been from Calcutta, viz, this year only 90,000 qrs, against 225,000 qrs. in 1856. This, however, was more than counterbalanced by an excess of 185,000 qrs. from the Black Sea, comparing the same periods. Bombay supplied 120,000 qrs., St. Petersburg sent us 190,000, Archangel 60,000, Riga 75,000, and Memel and other places in the Baltic about 80,000, and Alexandria and sundries 60,000 qrs. The Black Sea cargoes amounted to 377,000 qrs.; and were discharged at the undermentioned ports: Hull 130,000 qrs., London 70,000, Grimsby 25,000, Liverpool 12,000, Southampton, Ipswich, Dover, and Newcastle 10.000 each, Ireland 5,000, Leith and Lowestoft 4,500 each, Yarmouth 3,500, Boston 3,000, Rochester 2,000, Gloucester 1,700, and Lynn 1,200. At Antwerp 55,000 qrs. In Holland 18,000 qrs., and at Dunkirk 1,500 qrs.

The various continental ports were also furnished with about 160,000 qrs. from Archangel, St. Petersburg, Riga, Memel, and other Baltic ports; St. Petersburg supplying 40,000 qrs., Archangel 55,000, and Riga 35,000 of that quantity. From Riga, also, 75,000 qrs. of sowing Seed were shipped; nearly half to Ireland, and remainder to Germany, France, &c.

Linseed Oil has fluctuated much less than usual during the past twelve months; about £40 appearing to have been the turning point previous to the late collapse of all prices, caused by the existing state of general trade and high rates for money. In January the price opened at £37 10s., and the prospects of the supply of seed being very discouraging, crushers were most reluctant sellers, and held so firmly, it had advanced to £40 15s. by the end of that month. In February the speculators came in, and drove it up to £42 10s. on the spot, and £43 for summer deliveries; but the rise was too fast, and a reaction set in, so that before the month closed, the advance had been lost, and by the end of March it had declined to £39, with a very dull market. During April it receded to £38, at which price considerable quantities were taken for the French markets, and the value again quickly rallied to £40. In May it touched £42, thereby bringing out numerous sellers, and £40 was again the quotation at the end of the month. In June it was remarkably steady at same figure. July deserves special notice, for it was in this month that large sales (for delivery by end of September, and at first considered to be purely speculative) were made on Hamburg account, and the market consequently rendered very sensitive and unsettled. The price at which these sales were made was about £39 10s., and it afterwards occurred that several hundreds of tons of English-made Oil, which had been lying at Hamburg during the previous eight or ten months, were re-imported to supply the contracts so made. Our stocks, however, at this time were so light, the import was quickly absorbed, and, although the price was once quoted as low as £38, it had again recovered in August to £40.

We may here remark that the extraordinary export from Hull of the previous year is now accounted for, but the loss attendant on such a speculation will, we should think, effectually bar its reputation. If, also, the general style of business at Hamburg has assimilated to the reckless mode of trading shown by some of the operations in oil, we need not wonder that the late sad commercial disasters have been more severely felt there than in any city in the world.

In September there was a large and steady trade at a fraction below £40. In October it felt the effect of the money pressure, and with a wretchedly dull market had declined to £35 before the month closed. November was to have been the charmed month for the speculative account, and it had been calculated the options open, and the over-sold account together would enable the "Bulls" to force settlements at their own figures, first taking delivery of all the actual oil that could possibly have been tendered. An abortive attempt was made early in the month to run up the price, and £36 was quoted, but it was soon found the times were too difficult for such an operation, and oil proving much more plentiful than cash, a sudden drop to £32 occurred, and before the month closed a further fall to £28. In December holders continued to realise, and £27 10s. was accepted, but its present relatively low value to all other oils has attracted some attention, and we have the last few days had a good trade doing at £28 10s. to £29, with buyers for future monthly deliveries at an advance of £20. per ton.

The exportation, for the reasons just named, shows a very serious falling off. It amounts to about 16,000 tons only, against 23,000 in 1856, and 17,500 in 1855.

Linseed Cakes were in active demand during the spring at about £10 10s. per ton, and after being dull during the summer at something below that value, recovered as the autumn progressed, with every prospect of a further advance. Notwithstanding also the late general collapse of prices for all other articles, they still about maintained their quotations, and the last few days they have been in increased demand at £10. We never before had so steady a trade or so few fluctuations as in 1856.

The import of **Foreign Cake** has been unusually large, say probably 10,000 tons, or nearly 20,000 tons in excess of 1856 and 1855. The trade in January was quite of a retail character, the quotations being, for New York barrels £11, bags £10 5s., and square Marseilles £9 5s. C. F. and I. Early in February the market showed symptoms of improvement, and a fair trade was done at an advance of 5s. per ton on all descriptions; but it was not maintained, as very heavy arrivals of Marseilles frightened the dealers, and prices continued declining all through March. Importers' continued anxiety to realize dropped the value fully 25s. per ton by the end of that month, and early in April the lowest point was touched, say £9 7s. 6d. for barrels, and £9 bags. The great fall naturally attracted the attention of dealers, who made heavy purchases, but any advance was checked by the large supplies which daily came forward. The demand continued throughout May, and sellers showing less disposition to realize, obtained an advance of 10s. per ton. The consumption was great all through June, and very soon a further improvement was established, and by the end of that month an additional 20s. per ton obtained, the quotations being £11 for barrels, £10 10s. bags. During July we had no alteration in prices, and a steady trade was done; but there was a drop of 10s. per ton in August, in consequence of the slack demand. In September and October some anxiety was shown to provide for future wants, and prices rallied again, closing firm at £11 for barrels, £10 10s. bags. During November and December we have declined 10s. to 15s. per ton, and in consequence of the fine open weather all through these months, we have had but a slow sale, and our quotations today are £10 10s. for barrels, £10 for bags; square Marseilles about £9 C. F. and I.

Rapeseed and other Oilseeds.—The imports are about one-fifth less; say 200,000 qrs., against 264,919 qrs. in 1856, but the re-export not exceeding about 65,000 qrs., whereas in 1856 it was 150,000, it follows the quantity left for home consumption has been somewhat in excess of the previous year.

Rapeseed during the first three or four months was in request, and an advance took place from 63s. to 70s.; fine Bombay realising as high as 76s.; it afterwards declined to about 65s. in May, and has almost been a dead letter since, so little business having transpired. Prices are now nominally 53s., but the article is of most difficult sale. In warehouse, of all descriptions, we have about 45,000 qrs., and afloat 10,000 qrs., against 65,000 qrs. in granary and afloat last year.

The following are the quotations for other Oil Seeds, but they are at present quite nominal: Poppy, Sesame, Teel, Sursee, and Gingelly, 52s.; Niger, 45s.

Rape Oil this year requires nothing more than a register of prices. English refined scarcely varied during the first nine months of the year, and was quoted 52s. to 54s. during all that period, and only since the commencement of the panic has it retrograded in value. In October the price was 50s.; in November 48s. to 43s., since which it has recovered to 45s., and is steady thereat. The official imports, as at present given, combining all Seed Oils, we cannot give the comparison this year, but the aggregate makes it appear to have been double that of 1856. The home make has also been larger than usual, crushers having found it pay better to work than Linseed.

Rape Cakes has been in varying demand throughout the year, at about £5 10s. per ton for English, and £6 10s. for best Foreign makes.

Fish Oils held their values very steadily, and without great fluctuations, until October, when they sympathised with the state of the money market, and we have since had to quote much lower prices. **Sperm Oil** was £88 in January, rose to £100 in March, and afterwards fluctuated at about £90 until October, and is now only about £67. **Southern** stood at £46 to £50 during the earlier months of the year, and its nominal value to day is £42. **Pale Seal** is quoted £39, whilst, during the first six months of 1856, it was firm at £49. **Cod Oil**, however, has experienced the greatest decline, having within the last four months receded from £49 (at about which it stood for many months previously) to £29.

Tallow.—During the first six months of 1857 the market for P. Y. C. was the scene of one continued struggle between Bears and Bulls, ending in the former being severely punished, and we fear without a very profitable result to the latter: 58s. was January's value; 68s. February's; early in March it was supposed the speculation had again this year broken down, and a few venturesome sellers placed some at 62s., but were caught, and had to settle at 80s. at the end of the month. In April prices opened at 56s., but rapidly receded to 51s. 6d., and as quickly recovered to 59s.; May showed fluctuations between 55s. 6d. and 58s.; in June we had a repetition of the March account, for heavy Bear sales had also been made for April to June deliveries, in expectation that all the Tallow received and held over in March must come out for sale within that period, but sellers again "calculated without their host," and had to settle at 75s.

Since that period, although the speculative influences have been at work, we have not had the extraordinary fluctuations of the spring, and until the month of November, when in sympathy with every other article of commerce, Tallow experienced a great decline, the market was steadier than usual. In July about 58s. was the value; in August it ran up to 65s. It opened at 63s. in September, closing at 58s. 6d. In October it began to give way, and left off at 56s., declining rapidly to 47s. in November. It has since recovered to 53s., and is very steady to-day at this price.

London, Jan. 1. EDWARD EASTTY & Co.

ANNUAL REPORT OF THE LIVERPOOL WOOL TRADE.

General Remarks.—In our last annual review of the wool trade we expressed favourable views of the future. The state of business at that time was, in the highest degree, satisfactory, and held out promise of a continuance of the prosperity we had some time happily enjoyed; nor have these anticipations been altogether disappointed, since, notwithstanding occasional complaints of some branches of the trade being unprofitable, consumption during the greater part of the year continued on a scale of unwonted activity, which was sufficient to cause some uneasiness as to how this was to be met later on in the season. Notwithstanding the excitement which prevailed at one time on the subject of a short supply of cotton, it is doubtful whether there was not really more cause of alarm in the case of wool, which, under the most favourable circumstances, is susceptible of comparatively slow increase, and is besides liable to more than an average amount of casualties. We have referred to this on previous occasions, but general opinion has not altogether viewed it in the same light, and is least of all likely to do so in the present altered state of affairs. The argument of the Yorkshiremen has been that they have never yet met with actual scarcity, and, as long as there was money to purchase, they had no fear of any inconvenience. It is, however, an established fact that for several years past, in the spring there has been considerable excitement in the market, owing to the insufficiency of stock, and prices have for the time been considerably enhanced in consequence. It is well known that the consumption of wool has greatly increased in every quarter, and everybody who has the means of judging must also be aware, that the growth has not kept pace with it. The manner in which prices have been supported, and the fact that during a period of such unexampled pressure, a quantity of the value of one million sterling could be disposed of at the ate public sales at such satisfactory prices, at all events add ome weight to these arguments. With some slight intermission, trade continued good until October, and, although for some time previously a note of warning had been sounded from the United States, it failed to exercise much influence on this side; but early in this month the accounts became still more alarming, which induced the Bank of England to raise the rate of discount on the 8th October from 5½ to 6 per cent., rapidly followed by further advances during the same month to 8 per cent., which was again increased within the next fourteen days until on the 9th November the *minimum* rate had attained the unheard of point in this country of 10 per cent.! These stringent measures altogether failed to check the efflux of gold, and at length the position of the Bank of England itself became so critical that, on the 12th December, it was deemed imperative to suspend the Bank Charter Act. This gave some temporary relief; but the havoc caused in the meantime among the commercial classes had become too deeply rooted, and the feeling of mistrust had extended so widely that for a long time numerous failures continued to take place. Up to this time the panic had been chiefly confined to the United States and houses in this country, in France, Belgium, and Germany engaged in trade with that quarter; but it soon assumed greater dimensions, and became general throughout the whole continent of Europe, reacting again with great severity on this country. Produce for a long time continued almost unsaleable, even at very considerable sacrifice, and it may well be doubted whether any panic in our commercial history will bear comparison with the present, for intensity, protracted duration, and the extent of ruin it has caused. The number of suspensions has been truly appalling (estimated in this country alone at fifty millions sterling!) and while in many cases they have no doubt been the result of overtrading, fostered by indiscriminate Bank accommodation, still many old familiar firms have also had to succumb; it is to be hoped, however, that some of these will eventually be able to resume business. The Indian mutinies and the alarming state of affairs in that quarter have been a subject of engrossing and painful interest, and have tended in no slight degree to increase the gloom during the last few months; but happily the worst is now over, thanks to the ability and energy of our commanders and the valour and endurance of our troops; and it is to be hoped that our power will soon be completely re-established upon a firmer footing than ever, and that the railroads now in course of construction will greatly tend to consolidate and to develope the resources of that country. Notwithstanding the close of the year has been attended with so much to discourage, there is also great cause for thankfulness in the bountiful harvest with which Providence has blessed not only this country, but other countries also, and the very low prices of all necessaries of life will to some extent alleviate the condition of numbers of the labouring population who have been partially thrown out of employment.

Home Demand for Woollen Goods.—There has perhaps never been a period when the population has been so fully employed, and at such high wages, as during the past year. Consumption of goods has, consequently, been unprecedentedly large; and, under all circumstances, we think there are reasonable grounds to hope this will continue to a fair extent.

Export of Woollen Goods.—The continued increase in shipments for some years past has been very considerable; and, although in the previous year they had reached a very high point, we expressed an opinion in our last annual report, judging from the state of the markets abroad, that there was no reason to apprehend any falling off. This has been realized to the fullest extent; and, notwithstanding the decline during the latter months, chiefly to the United States, the exports for the past year will greatly exceed any former period; and we venture to predict that during the present year, to the United States, they will at least show no diminution.

CONSUMERS.—Even at the commencement of the year there was a strong disposition to resort to short time, chiefly by those who had missed the opportunity of supplying themselves while wools could be bought at anything like reasonable rates; but it was found the least evil of the two to work without profit, or even at a little loss, for a short time, till the new clip came to market. For some time after this, prices continued to advance; and those who purchased early must have done well, although parties holding large stocks at present (which, however, is quite exceptional) will have little cause for satisfaction. While the consumption has been very large, we believe, on the average, profits have been very small in the worsted districts; but those engaged in the clothing trade have occupied a much better position.

WOOL TRADE.—The home clip is computed to have been somewhat deficient in quantity, partly the consequence of increased demand for stock during the last two years, the improved position of the labouring population enabling them to expend more in animal food. The consumption of domestic wools has, at the same time, very materially increased in the worsted districts. Prices were firmly maintained in in the spring, particularly for bright-haired descriptions, which have throughout the year been much run upon. The defeat of Ministers on the 4th of March, on the Chinese question, rendering a dissolution of Parliament necessary, gave a check to business (Yorkshiremen taking a warm interest in politics), and, as clip time approached, prices became unsettled, buyers generally feeling indisposed to operate freely at the existing high rates. But as soon as the new wools came to market, great eagerness was evinced to stock themselves freely; and prices continued to advance, and probably at no time were wools more rapidly taken out of the growers' hands. The enlarged demand for home descriptions in the combing districts has been greatly to the exclusion of fine combing colonial, where formerly this description commanded the highest rates. It has nevertheless been in good demand for clothing purposes, the length of staple, combined with the healthiness of the wool, enabling them to mix up a large quantity of shoddy in the manufacture—a system which, owing to the high prices of wool, has been greatly on the increase. The reaction in business, which began early in October, took the trade altogether by surprise, even the most cautious; for up to that time the condition of the article was, on all hands, admitted to be as sound as could be desired. It is true prices were high, but this was clearly traceable to the large scale of consumption, which had existed up to that period, and if no interruption had taken place there cannot be a question that much higher rates would have been attained. There is scarcely an article that has maintained its position so well, or has been so exempt from failures during the late crisis. With the exception of the Public Sales in London, business has been at a complete stand for the last two months, and profitable inaction has been the rule, excepting an occasional forced sale either from alarm or to meet some pressing emergency. Some improvement has lately taken place, but prices must still be considered to a great extent nominal. The consumption, on the average, has been reduced to three or four days a week, but we think that our trade will be one of the first to feel the effects of returning confidence. The present position is widely different from the former panic in 1847, which was mainly the result of reckless overtrading and inordinate railway speculations. We had then also to contend with famine prices of all necessaries of life, whereas now they are correspondingly low—a very favourable feature in future prospects. At length we have been relieved from the 10 per cent. minimum Bank rate, which was reduced on the 24th ult. to 8 per cent., and there are indications that a much easier rate of money will ensue, and we think there is every reason to expect an early and general revival of trade.

WOOL IMPORTS.—Our receipts have greatly increased, having been 176,144 bales in the past year, against 134,846 bales in the preceding one, which may be taken as evidence of the central position and growing importance of this market. The late disastrous events all over the continent have greatly tended to divert shipments to this quarter, but we regret to observe that they have consisted to a large extent of uncurrent kinds, unsuited to our requirements, which are only saleable in brisk times, except at very low prices. It will be noticed that no less than 24,679 bales from the Australian colonies have reached this port, of which only a most insignificant portion was left here for sale; but this will create less surprise, when those interested in monopolizing the trade in London have freely stated that they will have them sent up there, even to be sold at lower prices than could be obtained here. Trade is of course at all times liable to vicissitudes, and it is well to place on record at least two occasions during the past year, when, if the wools had been retained here, the sales would have resulted in signal advantage to the importers. A great portion of the early arrivals from Port Philip was brought by the Liverpool clipper ships, of which part was sold here on arrival by private contract at 2½d. per lb. advance on the closing rate of the previous London public sales, and the whole might have been most advantageously disposed of here at the same time at auction, as the stocks were then quite exhausted and there was an eager demand. The next public sales in London, commencing in February, opened with a corresponding advance, which was well maintained for a short time, till the defeat of Government at once caused a reaction, the whole advance was soon lost, and up to the close the sales proceeded with very great heaviness. In confirmation of this, we may state that for some of these wools we ourselves made offers on arrival which were refused, and they were subsequently sold for 8d. per lb. less. The second case to refer to is the public sales held here September 30th, when 1,000 bales Port Philip met with a brisk competition at very satisfactory prices, fully maintaining the highest rates current at the previous London sales in July and August, but as we stated at the time, if the quantity had been of more importance, we have no doubt the result would have been more favourable. The subsequent public sales, in London, showed a decline from our prices of this description of *at least* 2d. per lb., but in most cases even 3d. to 4d. per lb. In both the instances stated there were circumstances to account satisfactorily for the decline in London, and we do not mention them for the purpose of unduly asserting the importance of this market, but they are at least evidence that two most favourable opportunities were lost to the importers.

WOOL EXPORTS.—A good demand has existed during the greater part of the year, chiefly for fine Colonial, which shows considerable increase. The alteration of the American Tariff admitting wools costing 20 cents (10d.) per lb. entirely free of duty after the 1st July, caused in anticipation a very brisk demand both in this country as well as abroad for all low descriptions, and, owing to the scarcity at that period of the year, prices were considerably enhanced in consequence. Notwithstanding the liberal scale of imports, the increase has been almost absorbed by the greatly increased quantity re-exported, and the supply on hand embraces a comparatively small proportion of really saleable descriptions.

AUSTRALIA.—The first sales of the year continued from the 26th February to the 17th March, and the quantity of fine colonial offered was 41,375 bales, including 18,744 bales Cape of Good Hope. The interval between the previous sales was longer than usual, and the stocks being extremely light, these sales opened with considerable spirit at an advance upon November rates of 2d. to 3d. per lb. on Australian, and 2d. per lb. on Cape. There was much apprehension with part of the trade, owing to the small supply announced, and it is probable that even a larger advance would have resulted but for the very opportune additions of new arrivals just before the sales commenced. The opening prices were firmly maintained for about the first week until pressing demands had been satisfied, and the dissolution of Parliament occurring at the time, at once caused a reaction, and the advance was almost entirely lost before the close. The second series continued from the 30th April to 29th May, consisting of 62,143 bales colonial, including 7,604 bales Cape. The quantity was larger than usual for this period; during the first fortnight prices showed a decline of 1½d. per lb. from the close of the previous sales, and as they progressed, a little further weakness for a short time ensued, which however was fully recovered before the termination. The General Election, which had just taken place, had proved a great hindrance to business, and the prevailing high rate of money determined home buyers to act with great caution, and their operations were very trifling till towards the close; on the other hand, foreign buyers being without stocks, and finding an excellent assortment of first-class wools, came out very strong on this occasion, particularly at the beginning, and their purchases were very extensive. The third series continued from 16th July to the 22nd of August, and the quantity of fine colonial was 80,806 bales, including 12,452 bales Cape. Prices having gone very high at the German wool fairs and all over the continent, the same being the case with our own clip, these sales opened under very favourable auspices, aided by the promising appearance of the growing crops, and the relaxation in the Money Market. Foreign buyers again appeared in great numbers, operating very freely, and, notwithstanding the unusually large quantity, (of 2½ millions sterling value,) and the great caution still evinced by home buyers, an advance was established at the commencement of 1½d. per lb., and after a short time a further improvement took place of 1d. to 1½d. per lb., which was supported to the close. At the fourth and last series of the year, which took place from the 12th November to the 4th of December, the quantity of fine colonial was 44,873 bales, including 16,858 bales Cape. These sales opened under circumstances of extreme depression (the minimum Bank of England rate having been only a few days before raised to 10 per cent. !) at a decline from the closing rates of the previous sale of 2d. to 3d. per lb.; but as they continued under the influence of increased pressure, a still further reduction was established of 1d. per lb., chiefly applicable to wools in faulty condition, which, being in great superabundance, increased the prevailing heaviness, and notwithstanding the frequent withdrawals (which were partly again introduced into subsequent catalogues) failed to arrest the decline. Sydney wools show improved management, which is also particularly observable in Tasmanian flocks. This is not altogether the case with Port Philip wools, although, on the whole, the condition has been favourable. New Zealand wools are increasing in favour, owing to the peculiarly healthy growth, and the only drawback is their imperfect condition. Adelaide wools exhibit considerable improvement, and although the greater part imported last year has been in the grease, we do not look upon this as any impediment to their usefulness, as the prejudice even in this country against unwashed wools is much abated. It is rather a serious matter to notice that for several years the total receipts from the colonies have been almost stationary, while during the past year there has actually been a decrease, and notwithstanding the facilities for early shipments, the quantity still to come forward for the next sales will be very small.

Cape of Good Hope shows a continuous and rapidly increasing supply. There has been a marked improvement in the growth of the wool of late years, and such flocks as are well managed are now much esteemed both by home and foreign buyers. It is, however, much to be regretted that a considerable portion has been of imperfect growth, arising from the practice of shearing twice during the year, which cannot be too strongly deprecated, being both injurious to the animal and the quality of the wool, for whatever the grower may gain in quantity is more than absorbed by the deficiency in price, such wools besides being a very uncurrent sale. This system is by no means uncommon in some parts of Germany and Hungary, and it is principally by the German and Dutch colonists that this very objectionable custom has been practised.

Germany.—The growth appears to be stationary if not retrograding, and is by no means adequate to the increasing domestic wants there. The import is no longer considered worth following, and is chiefly confined to lambs' wool, and Hungarian and other medium qualities in the spring of the year, when our market is usually buoyant and prices are high.

Spanish and Portugal.—The receipts as well as demand for the former have almost ceased, and they are chiefly sent to France, where they are more estimated than in this country. Estremadura wools are at all times a favourite article here, provided they are in good condition, being of a useful medium quality; on the other hand, the heavy and gummy descriptions are mostly of uncurrent sale, except in a very brisk market. Long Oporto Fleece met with a ready sale during the greater part of the year at full prices, but the late stagnation in the demand for English Combing Wools has rendered them for the time almost unsaleable. Cotts and Lambs have generally been disposed of on arrival.

United States.—In our last annual report we pointed rather significantly to the probability of an early alteration in their tariff, which took place soon after, admitting wools after the 1st July, not exceeding 20 cents per lb., entirely free of duty, other descriptions being subject to 24 per cent. ad valorem. Although this is a very imperfect measure, it is at the same time an important step gained, and was not carried without great agitation, there being a strong interest opposed to it, and it was only passed at the last moment before the rising of Congress. This at once caused a very active demand for all descriptions, and the supplies thus directed to that quarter would, even under the most favourable circumstances, have probably proved excessive; but arriving chiefly during the period the panic was severe, and sales altogether impracticable, a large quantity was at once re-shipped to this country, of which a great portion are very unsuited to our consumption. We have also received 1,400 bags of the domestic growth of the United States. None of these wools have reached us since 1847, when they were subsequently chiefly bought up for re-shipment. Although we notice considerable improvement both in the wools themselves, as well as in their condition, still in the latter respect there is much to be desired, and arriving too at a most unfavourable season, they have failed to engage the attention of the home trade to the extent which we think their merits justly deserve; but we do not doubt that in the spring, when stocks of Port Philip, New Zealand, and Van Diemen's Land will be light, they will meet with favour, and in the meantime the trade will have had an opportunity of fairly testing them.

Buenos Ayres and River Plate.—The direct imports have been to a full average extent; and a fair quantity besides has reached us through Belgium and Italy. Early in the year, better qualities engaged considerable attention, and the first arrivals, both of washed and greasy, were sold at once at extreme prices; but the most favourable period of the year was in a great measure lost by the interruption to business soon afterwards caused by the general election. Some quantity was forced off at extremely low rates, which completely unsettled the market; and, for some time, very little business was done. Prices, however, soon rallied, and sales to some extent were made, at from 1s. 10d. to 2s. 1½d. for good-conditioned parcels; but both Merinos and Mestizos in wasty condition, and particularly burry, have not been in much favour. Of common qualities the supply has been limited; and, for the present, we cannot encourage importations. Cordova as well as Santiago wools are well adapted to our wants, and will generally meet with ready sale; but the latter are open to objection on account of the burr.

Peruvian and Alpaca.—There has again been a large increase in the supply of sheep's wool. At intervals it has been operated in pretty freely, but, on the whole, has not engaged much favour. Alpaca shows greatly-diminished receipts, owing to the civil war and the blockade of the principal ports during the latter months; and the stocks there awaiting shipment are reported to be very small. The demand has been good throughout the year; and sales have been principally made for arrival. The high prices ruling here for some time past would no doubt have encouraged a full supply, had not the impediments to shipments existed to which we have referred; and it will necessarily continue light for some time to come.

East India.—The total receipts show a steady increase, and no less than five-sixths have reached this market, a proof that it continues to be regarded as the most favourable for the sale of this description. Our public sales have attracted considerable attention; and at the last October series 15,723 bales were disposed of, which only a short time back would have been considered impracticable; nevertheless the whole was taken freely by the trade, and the last day's sale showed even increased spirit. Persian and other long-stapled kinds of well-bred wools have been in great favour, and on most occasions have brought very extreme prices, owing to the high value of English combing wools, for which they were required as a substitute. These kinds experienced a serious reaction at the late London public sales, in consequence of the heaviness of the market for English wools. It is now some time since we first drew attention to this particular class; and we would again repeat, that any trouble and expense would be amply repaid in increasing the growth of this very useful description, and we are of opinion that the most extreme prices they have yet attained have not exceeded their intrinsic merits; they have hitherto been chiefly tried for experiments, and as they become better known they will command a wider consumption and a higher permanent value.

China.—The import continues on a limited scale, and so far from any improvement the condition has been even worse than usual. This wool could be used with advantage, if a moderate degree of care was taken to make it acceptable to our consumers.

Russia shows a large increase, chiefly of Donskoy. Until the latter part of this year Donskoy wools were in fair demand, while superior parcels were much sought after, and were readily saleable at 11d. per lb. Sales were made at this price nett cash, and it is probable that 11½d. per lb. might have been obtained, if a further quantity of superior wool had been available at the time. It is to be regretted that the quantity of healthy-grown bright combing wool is much diminished, the great bulk being very cotty and short in staple, besides very scurfy and containing a large proportion of broken wool. The quotations abroad for this article are still much above what can be obtained here. Autumn and Lambs' have not engaged much attention. There has been very little done in brook-washed, or scoured, but for both we consider the prospects favourable. These kinds have been much sought after in Russia, and already some extensive contracts have been made for next season's delivery in August and September, for Continental account, at very full prices.

Mediterranean.—There has been a moderate increase, but the various kinds do not call for particular comment, having comprised a large proportion of inferior kinds, imported chiefly with the view of meeting the demand for the United States, of which a large quantity still remains on hand.

Egyptian has fallen much in discredit, owing to the great prevalence of spurious kinds attempted to be passed off under this name. The pure glossy article continues as much in favour as ever, but is now rarely met with except mixed with Syria, and other inferior wools, which are altogether unsuited to the same purpose.

Turkey Goat's Wool or Mohair.—Although the import has been on rather a liberal scale, there has been a good demand throughout the year, and at no time has there been any accumulation of stocks, sales having been largely entered into for arribal at advancing rates.

Iceland.—The supply has not equalled the previous year, but it has increased in favour with the new branches of the trade, owing to its peculiar brightness of colour and softness. Early in the season sales were made, both on the spot and for arrival, at 13½d. per lb.; but subsequently, some transactions took place at 12d. to 12½d. per lb., chiefly for Southland wool. The remaining stock consists principally of Northland, including some parcels of very superior quality and length.

Barbary.—The import has been below an average. Medium and fine qualities in good condition generally meet with ready sale, but for the most part they are still open to the objection of being very sandy, burry, and in damp condition, which render them almost unmarketable.

Domestic Wools.—Prices of **English** have been well maintained, with a general tendency to advance till the late panic occurred, and since then they have been altogether nominal. Some very low sales have been reported, made under circumstances of peculiar pressure, and can therefore, hardly be considered any fair criterion of value. The stock remaining in growers' hands is particularly light, and from the absence of purchasers for several months, consumers are supposed to be pretty well reduced in stock. During the last week a good many buyers have been looking round, and any lots offered at moderate rates have been freely accepted, so that prices will soon assume a fixed value. In **Ireland** the same limited supply exists, and at the present time, owing to the large quantity exported, the whole country could probably not furnish more than in former years might readily have been met with in one single district. **Scotch.**—*Laid Cheviot* has been in very moderate demand, and prices have been chiefly maintained by speculative purchases, rather indiscriminately entered into, which were subseqnently thrown upon the market under very unfavourable circumstances, entailing very heavy losses and a depreciation in value disproportionate to any other description at the time. *Laid Highland*, on the contrary, has maintained a high price, and been much dearer than corresponding qualities of foreign.

Sheep Skins have met with uniformly good demand during the greater part of the year, and have been saleable on arrival at satisfactory prices; but of late there han been a great desire to press sales of *English* skins, and there has been little attention directed to *Foreign*, of which there is only a trifling stock.

Liverpool, Jan. 1st. HUGHES AND RONALD,
Wool Brokers.

TRADE OF THE PORT OF HULL.

REPORT FOR THE YEAR 1857.

During the eventful year now closing, the business of this port has been carried on on a very extensive scale, as the amounts of tonnage and of the tabulated exports and imports fully manifest. The severe money pressure which has prevailed for the last few months naturally restricted transactions and depressed prices, causing also a great accumulation of stocks of many of our leading articles of import. The Bank of England having now, however, reduced the rate of discount, and an easier position in our monetary affairs resulting, will, it is confidently anticipated, cause a resumption of business in this quarter, and a greater activity of the general trade of the country.

The gross tonnage entering the port this year amounts to 1,085,390, against 1,076,787 last year, showing an increase of 8,603 tons. The number of ships and vessels reported inward on foreign voyages is 3,033, tonnage 738,082, whilst last year the number was 3,157, and tonnage 743,157, showing a trifling decrease. The tonnage of steam vessels in the foreign trade this year is 47,240, against 28,229 in 1856, and 14,392 in 1855, exhibiting an increase in the number and tonnage of our steamers of nearly 100 per cent. from year to year. The year 1856, it will be remembered, greatly exceeded, in consequence of the cessation of hostilities with Russia, any previous year in the extent of our trade.

Grain.—We have again to record at the close of this year a great reduction in the value of all cereal produce, which, at a time like the present, when the manufacturing interests of the country have hardly begun to recover from the shock of the commercial disasters above alluded to, must be a source of congratulation to the consuming public, the price of the staple article of food in this country being now lower than it has been since the summer of 1853. It is no part of our duty to venture an opinion as to the future range of prices of an article so changeable and so dependent on seasons as grain; but the value is now reduced to such a point that the agricultural interest already complain of unremunerative prices; and when such is the case, it is generally admitted—so intimate is the connexion between them—that the manufacturing interests of the country must also be in some measure affected *pari passu*. Already the growers appear to have made a stand; and for the above reason, and the failure of the potato crop, as well as the prospects of a resumption of activity in our manufacturing districts, an upward movement in price is by no means improbable, the extent of which will greatly depend upon the supplies that are likely to reach us from America and other corn producing countries before the coming harvest. At the commencement of the year the value of good red English wheat was about 60s. per qr., with a prospect of a still further advance, as the previous crop—not only in this country, but on the continent—was defective both in quantity and quality, added to which a considerable demand for export existed from the South of Europe. Prices, however, instead of improving, rather declined, large supplies from the Black Sea and Mediterranean having satisfied the requirements of the Peninsula. At the end of the first quarter, in consequence of more liberal supplies from our growers, and larger imports from abroad than were calculated on, prices gave way 5s. per qr. on English, and 4s. to 5s. on foreign sorts. A better demand however set in, and by the end of May the value had more than recovered the depression existing in the four previous months; and at the end of June English red was quoted 68s. to 70s., mixed Dansig 66s. to 70s., Baltic red 60s. to 64s., and Russian 58s. to 62s. per qr. A good consumptive demand nevertheless continued, and in the month of June prices appear to have reached their highest point. The approach of the harvest at this time was signalized by the most brilliant weather, and the splendid appearance of the wheat crop was all that could be desired. Prices accordingly soon gave way; in fact, a sort of weather panic appeared to influence all parties connected with the trade, and a decline of 10s. per qr. was submitted to before the end of July. In this locality heavy storms, attended with severe floods, endangered the favourable ingathering of the crops, a portion of which had eventually to be harvested in a state hardly fit for human food. Still, taking the country throughout, it is generally admitted that this year's crop of wheat is fully an average, both as regards quantity and quality; and this appears to be fully borne out by the general, yet important, reduction in value. At the end of August, at which unusually early period the bulk of the wheat crop was secured, new English red of first quality was worth 60s. to 63s., old English 60s., Baltic red 55s. to 58s., and white 60s. to 62s. per qr. From this date the value remained pretty steady, until affected by a more stringent state of monetary affairs; this increasing in intensity, drove prices rapidly downward until the middle of the month of November, at which time we appear to have reached the lowest point, red English wheat having been forced off at 45s. per qr., 63lbs.; Baltic red for 46s. to 48s, choice white 52s. to 54s. Since then the gradual and apparently sound improvement in commercial matters generally, combined with a good consumptive demand, partly arising from the failure of that valuable esculent the potato, the prospect of a cessation of supplies from abroad of any magnitude for some time to come, the tone of the market has gradually improved, buyers generally show less hesitation in operating, and prices have advanced on all good useful wheats 2s. to 3s. per qr., at which advance we close the year, with a good steady trade. The stock on hand is estimated at 74,000 qrs., against 40,000 qrs. last year.

Barley.—The import of this cereal during the year has been on a very liberal scale, exceeding any since 1850, being 250,682 qrs. These large supplies have principally reached us from the Baltic, whence little has been drawn for many years past, and part from Turkey, where the cultivation has very much improved, as shown by the quality of the shipments. This grain has during the present year commanded high prices, English malting up to the close of the malting season having brought 46s. to 48s. per qr. About this time arrivals to an almost unprecedented extent from Silesia and the Baltic Ports affected its value, which declined 3s. to 4s. per qr.; but well-founded accounts of continued drought on the Continent endangering the crop, produced a speculative demand for everything of malting quality, and prices soon rallied. Monetary causes, however, having affected this in common with every other article of import, the value declined, and at the close of the year quotations were 34s. to 36s. for English, and 32s. to 35s. for foreign malting; whilst grinding stands at 28s. to 29s. for stout, and 27s. to 27s. 6d. for thin qualities. The stock on hand is 4,000 qrs., against 31,500 the previous year.

Oats —The import this year consists of 99,500 qrs., against 42,045 the preceding one. This grain has fluctuated less than any other; prices scarcely varied from the commencement of the year until April and May, when, owing to the drought and the backwardness of the season, an advance of 2s. per qr. was obtained; this, however, was of no long duration, prices since having gradually followed in the wake of other articles, and close considerably lower, especially for Russian, of which the major part of the stock here at present consists, say 28,000 qrs., against 3,000 qrs. in 1856.

Beans.—The import shows a small decrease as compared with last year, the same being 57,956 qrs. this, and 69,756 up to the end of last year. The demand has been good throughout the year, and, with the exception of some portion of Egyptian supplies, which went to granary on arrival, nearly all the supplies from the Baltic and nearer ports were realised ex-ship, and the stock is now very light. In the first and second quarters of the year prices varied from 38s. to 44s., third from 43s. to 46s., October and November 42s. to 43s., and the closing prices are now 38s. to 39s. per qr., all 63lbs. per bush. Stock 9,500 qrs., against about same quantity last year.

Peas.—The supplies have been very large in comparison with those of the preceding year, when they reached only 4,736 qrs.; whereas this year they amount to 24,004 qrs. Although the demand has been confined to mere consumption, supplies have found ready sale, and the year closes with but a small stock. In the first half-year prices ruled from 38s. to 42s.; during the following five months, from 40s. to 48s.; and the present value is 38s. to 42s. per qr. of 63lbs. Stocks small—say 2,500 qrs.

Clover and other Agricultural Seeds.—During the present year seeds have been subjected to great fluctuations, particularly red cloverseed, which early in January opened at rather moderate prices; but in consequence of fine genial weather prevailing from the middle of that month to the second week in March, an active demand appeared, and was continued up to this period for all descriptions of seeds, and prices were well maintained, whilst in some cases there was a considerable advance, red cloverseed having improved in value since the opening of the year 8s. to 10s. per cwt. About the middle of March, however, from unfavourable weather, the trade was almost suspended. Notwithstanding this great curtailment of the consumption, the stocks at the close of the season were by no means extensive. The new crop of red cloverseed promises well as to quality, particularly in Holland and Belgium, from both of which countries we have had some arrivals of very choice seed; the breadth that has been cultivated, however, is said to have been small. In Germany the crop has not been well spoken of as to quality, in quantity pretty fair. In France moderate, with an average quality. In this country the crop at one time was expected to be an abundant one; but in consequence of the long continuance of wet weather at the time of maturing, the seed was much injured both as to quality and production; but it is still thought there will be a tolerable yield in some districts of rather inferior seed. The new crop of white in Germany, whence we receive our principal supplies, is reported to be very much short of last year, both in quality and quantity, particularly as respects the latter, and under this impression prices have been well supported, fine and middling old seed having sold the last few weeks at higher prices than such qualities would have produced at the close of the season and to the present time. We have had very small arrivals of new seed.

Linseed.—Of this article our import has been again very large, being only a few thousand quarters deficient of last year's, which was the greatest import recorded. The year commenced with considerable stock in warehouse; notwithstanding which, the value of seed steadily improved, until Black Sea qualities attained 68s. per qr. in March. Our imports becoming large about this time, prices gradually gave way about 5s., the value in April of Taganrog seed being 62s. to 63s. For the next two or three months the market fluctuated to the extent of 2s. to 3s. per qr. in favour of sellers, but prices were generally well maintained until the development of the financial crisis in the beginning of October, which influenced the value of this article very severely, and in the course of two months a decline took place on fine seeds of about 15s. per qr. from the utmost value; common qualities suffering in proportion, the prices at the close of the year being 49s. to 50s. for fair quality of Taganrog and Odessa seed, 46s. to 48s. fine Petersburg 52lbs., 43s. to 45s. for medium, while inferior are not saleable at beyond 38s. to 40s., weighed 51lbs. The position of of the crushing trade during the year has been of an unsatisfactory nature, the value of seed having been kept up at an extraordinary high point, which generally precluded the manufacturer from carrying on his business in a profitable manner, the raw material being so much above the relative value of its produce. The great fall in prices has been, to some extent, a natural consequence of this state of things; and values having now assumed a level more in accordance with that of previous years, there is every probability of this important branch of our trade assuming a more healthy condition. The stock in public warehouses and in crushers' hands we estimate at 170,000 qrs., being more than double that of the previous year, and a larger stock than has ever been held over in this port.

Linseed Oil.—The stocks of this article at the commencement of the year were light, the value being about 37s. 6d. per cwt. An improved demand, partly speculative, developed itself early, the highest point for the season having been attained about the middle of February, when we quoted close upon 42s. per cwt., after which a gradual decline of 2s. to 3s took place, which continued with occasional fluctuations, until prices gave way in sympathy with the raw material, as above stated, the lowest point attained being 27s. per cwt. We however close the year with a slight improvement, the price being 28s. 3d. to 28s. 6d. per cwt. The natural effect of a high range of prices during the year has been a considerable falling off in the extent of our exports to the continent, which are 7,184 tons, against 12,549 tons in 1856. The stocks, which were considerable two months ago, have been much reduced, and the low price has attracted the attention of speculative purchasers for forward delivery, at prices about 2s. per cwt. above the value on the spot, thereby showing a greater degree of confidence in the article than has been evinced for many weeks past.

Linseed Cakes.—The year commenced with small stocks, and prices of best Hull-make at £10 10s. per ton. A brisk demand towards the end of January, backed by limited supplies, drove prices up to £12 2s. 6d., which was the highest figure they reached during the year. Up to the month of June the demand was slow, at a decline of 30s. per ton, when, owing to the dry scorching weather, they became in great request, at advancing rates, say £11 for best quality, with a considerable demand for forward delivery at 5s. to 10s. more. There was little variation in the value for immediate delivery up to Oct., when the fine autumnal weather, which reached far into Dec., interfered with the demand, and the value gradually fell to £9 15s. per ton. The stocks held by crushers are comparatively light, and many makers decline working at the present low rates of this article and oil, owing to the unremunerative nature of the business. Foreign of good quality have been in fair demand during the year; these are now in small supply, a great portion of the present stock being inferior in quality and condition. The imports of foreign this year show a considerable increase, being 14,261 tons, against 9,547 tons at the close of last year. A steady consumptive demand has been experienced throughout the year for all good foreign qualities, at proportionate prices to the English manufacture, say from £8 to £8 5s. per ton, for "small-shaped" cakes. An increased proportion of the imports consisted of large English-shaped cakes, which, on account of their form and superior quality to the ordinary make, commanded prices approximate to the value of best English manufacture. Towards the close of the year arrivals have been moderate; but the consumption of cakes, on account of the mildness of the season, has been equally limited. Stocks in warehouse are considered of fair extent, being principally of low qualities, and consisting of about 2,500 tons, against 1,300 tons the year before.

Rapeseed.—The import of this article considerably exceeds previous years, being 6,100 lasts, against 1,690 and 1,404 lasts the two previous years. Prices of new German seed ruled in the autumn months about £35 to about £36 per last; since then, owing to the languid demand for oil, the value has receded to £29 to £30, but these prices must be considered as nominal, purchasers for the present being quite out of the market. Stocks are, however, very light, and with an improvement in manufacturing districts, a better demand may be expected. The bulk of the imports has this year been on crushers' account, little appearing in our market.

Rapeseed Oil.—The demand throughout the year has continued to be a purely consumptive one, and at no time was there anything worthy of particular note in the value or demand of either English or foreign, the import of the latter having been on a very limited scale. The supply exceeding the demand during the few last months, brought prices down to £42 for brown, and £44 to £45 for pale oil, at which the year closes.

Rape Cakes.—The value of this article has ruled unusually the same throughout the year, there having been a fair demand for good green qualities at £6 to £6 10s. until the last few months, when they declined 10s. to 15s. per ton, Foreign cakes have fluctuated from £5 7s. 6d. to £5 12s. 6d. per ton, their present value, up to £6 15s. per ton, the highest price reached in March and August. Imports went into consumption as they arrived, and there consequently has been no accumulation of stock.

Olive Oil.—The import this year has been 3,410 tuns against 4,920 tuns in 1856, the present stock remaining a trifle over that of last year at the same time. Prices, as was anticipated, were well maintained with little variation during the first nine months of the year; subsequently, in consequence of the reports of good crops, larger supplies than usual of Rapeseed, and forced sales during the money panic, prices have ruled very irregular, and are expected to continue moderate for some time to come, owing to favourable crops, and from the fact of the largest holder at Naples realising all his heavy stock, causing a reduction in the price of about £15 per tun free on board from the highest point.

Flax.—The import for the year has been 19,466 tons, against 18,941 tons in 1856, 14,909 tons in 1855, and 12,271 tons in 1854. Of the present year's import, 8,870 tons are from the Baltic, against 9,030 tons in 1856, 7,465 tons in 1855, and 4,831 tons in 1854; the remaining quantities were received as follows, viz.: 3,852 tons from Holland, 5,583 tons from Belgium, 866 tons from France, and from sundry ports 295 tons. The imports of Tow and Codilla amount to 3,381 tons, of which 2,328 came from St. Petersburg, and only 20 tons from Archangel. During the season the consumption has been of a healthy character, but since the money panic prices have been more irregular, and the demand limited to the actual requirements of the spinners, the mills being put on short time. It must, however, be remarked, that during the late depression the linen trade has suffered much less than any of the leading branches of the manufactures of the country. The stock of Flax is moderate at this port, and a revival in the consumption is confidently anticipated.

Hemp.—Of this article the imports are 1,575 tons from Petersburg, 1,157 tons from Riga, 62 tons from Bombay, and 145 tons from sundries, making a total of 2,939 tons, against 4,043 tons in 1856, 3,341 tons in 1855, and 2,690 tons in 1854. The consumption of Hemp for roping purposes is evidently much curtailed by many substitutes now brought into use, but the short Hemps, for manufacturing purposes, are much demanded. The prices of clean Hemp during the year have been much affected by the extensive speculations entered into during the winter and spring at St. Petersburg. In addition to the influence of the late money panic, the heavy stock of clean held in London has greatly increased the decline in value, and takes away any present prospect of advance in prices.

Tallow.—The largest proportion of our import into this place, which this year reached 3,000 tons against 2,160 last year, goes direct to the consumers, or into the hands of Liverpool houses, the prices being regulated by those of the London markets, to a very great extent, in which the fluctuations have this year been remarkable. The stock on hand is about 2,000 casks against 500 last year, and the value 53s. per cwt.

Iron.—Our imports this year are 34,000 tons against 32,000 in 1856. The prospect of good demand in the beginning of the year was realized to some extent, a considerable business passing during the spring months at slightly advanced prices. A fair proportion of our large supplies have gone into consumption; but for the last few months the influence of the money panic, which from the extensive transactions with the U. S. was first felt in this trade, has rendered business impracticable, and we close the year with considerable stocks on hand, which can only be reduced by a resumption of activity in our manufacturing districts, and a sound natural demand from other countries.

Hides.—The imports during the year have been very limited of all sorts of continental hides, except Petersburg kips, of which rather a large quantity has come. Prices ruled very high up to September; since then a very rapid decline took place, and present quotations, though in some instances 30 to 40 per cent. less, must be considered nominal from the absence of buyers. The stock is small in this market.

Cattle Bones.—The import this year is 14,261 tons, against 16,200 in '56. From its commencement a gradual advance in prices of bones and bone ash took place, arising from a continued good demand and short supplies. For weeks we had no arrival, a better market having been found for the article in France and Holland. As parcels dropped in they were taken up at prices varying from £6 10s. to £6 15s., and we close the year at this last figure, stocks being 228 tons, against 3,000 last year.

TAR.—The imports of this article in the fore part of the summer up to September continued small, in consequence of which the price, instead of ruling somewhat below, kept at about a par with the rates obtainable during the same period in London; Stockholm tar keeping up, with little variation, at about 16s. per barrel. Towards the end of September, the supply, through larger arrivals, becoming more abundant, the price receded to 14s., and later in the season down to about 12s. 6d., at which the article may now be quoted in first hands. The imports, including Archangel tar, which description in a general way does not come much upon the market, reaches a total of 26,818 barrels, being in excess of that of last year, which was 22,531 barrels. Of this import, about 3,500 barrels have been landed for higher prices, and one parcel of about 1,700 barrels is now in course of sale in small quantities from the importing ship.

TURPENTINE.—The direct import this year is 7,353 barrels against 9,376 barrels last year; but this affords no criterion whatever of the quantity used by distillers in this quarter, who receive by far the greater proportion used by them from London. The value of this article remained pretty steady during the first part of the year, but in the month of July, in consequence of a reported scarcity in the United States, prices advanced to 45s. per cwt. This high value was not, however, long maintained, and the year closes at 33s. to 34s., with a small stock on hand.

WOOD.—The import this year has shown a large decrease on the preceding one, as will be observed by the tables. The demand throughout the year has been very languid at generally declining prices, until they reached their present position, a lower value than has existed for many years past, especially with regard to Baltic goods. These prices are difficult to quote, arising from the irregular nature of recent transactions, and the result of the disturbance in our monetary affairs. The stocks on hand are considerable, but not above the requirements of a return to a nominal condition of commercial matters; and as the prospect of this is no longer doubtful, a good demand is anticipated in the ensuing year.

SHIPPING.—The past year has been a very unsatisfactory one for the shipping interest generally, and very few vessels can have done much good. Our local trade has had more than its full share of the general depression, for although the gross tonnage into the port appears large, much of it is owing to the rapid passages and continuous arrival of steamers, and a more than ordinary proportion of ships arriving, have been seeking vessels, fixed at unremunerative rates on the other side. The Colonial trade has been as dull as it could well be. Freights have been about 85s. Quebec, and 90s. to 95s. Richibucto, Buctouche, Miramachi, &c., with very little doing. Baltic wood freights have also been scarcely worth attention, and have varied very little. During the season the rates have ruled from Dantsic, 15s. to 17s.; Memel, 15s. 6d. to 17s. 6d.; Sundswall and Holmsund, 19s. to 20s.; Windau, 17s. to 18s. 6d.; Riga, 25s. to 27s.; Cronstad, 42s. 6d. to 47s. 6d.; Wyburg, Fredricksham, 47s. 6d. to 52s. 6d.; Archangel, 4s. 9d, seed; Riga, 42s. 6d. flax. At the close of the year seeking ships have had to leave the Russian and some of the Prussian ports *in ballast*. Altogether, shipowners may be very glad to turn their backs upon 1857, especially as there is rather a hopeful feeling as to its successor.

P. BRUCE,
Secretary to the Hull Chamber of Commerce.

EXPERIMENTS WITH DIFFERENT MANURES.

Some few weeks ago a correspondent suggested that farmers who had been making experiments with different kinds of manure should send to you an account of them, with the results obtained, and you expressed your willingness to publish them. I take the liberty of reporting to you a statement of experiments made by me on my turnip crops during three years, and hope you will find room for it. I vouch for its accuracy, everything connected with the experiments, from the weighing of the manures to the pulling and weighing of the turnips, having been done by my own hands. I may mention that none of the manures were procured expressly for the purpose of making a comparative trial, but were all portions of larger quantities bought by myself or my father at Over Roxburgh farm.

	Quantity of manure.	Cost per acre.		Weight of turnips pe acre.		
1855.		s.	d.	Ton	cwt.	qr.
Shark's Bay guano	4 cwt.	35	4	7	8	1
Latham Island do.	4 „	37	6	10	16	3
Hottentot do.	4 „	33	6	11	10	3
Farm-yard dung	15 loads at 3s.	45	0	13	0	2
Patagonian guano	4 cwt.	33	6	13	2	3
Saldanha Bay do.	4 „	37	6	13	4	3
Peruvian do.	4 „	50	6	13	18	2
A mixture of these guanos	4 „	38	0	10	0	3
1856.						
Patagonian guano	6 „	31	6	14	0	2
Do. do.	8¼ „	45	0	18	8	3
Bone ash	6 „	45	0	14	12	0
Saldanha Bay guano	6 „	45	0	18	10	0
Peruvian do.	4 „	45	0	14	12	0
Do. do.	6 „	69	0	19	2	2
Mexican guano from Mr. H.	6 „	45	0	20	5	0
Do. and Peruvian	4 4-5ths „	45	0	20	17	1
Mexican guano from Mr. O.	6 cwt.	28	6	10	2	2
Do. do.	9½ „	45	0	14	12	0
Do. and Peruvian	6¾ „	45	0	14	17	0
Hottentot guano	6 „	45	0	19	2	2
C. dissolved bones	6 „	45	0	13	10	0
B. dissolved bones	6 „	45	0	12	7	2
Bone dust	14½ bush.	45	0	13	10	0
Do. and Peruvian	equal weights	45	0	13	16	0
1857.						
Patent wool manure	6 cwt.	45	0	18	2	0
Patagonian guano	8 „	45	0	14	10	2
Hottentot do.	7 „	45	0	17	11	1
Peruvian do.	4½ „	67	6	17	18	0
Falkland Island do.	4½ „	45	0	19	10	1
Superphosphate (Berwick)	5¼ „	45	0	13	14	1
Do. (Mr. O.)	5½ „	45	0	13	10	2
Ammoniacal do.	5½ „	55	0	14	3	3
Mixture of the above	6 „	45	0	17	18	0
Sawdust steeped in pure chamber-lye for 6 weeks, and sown with a good handful along the drill.	—	—		17	8	1

In 1855.—Sown June 12, weighed Nov. 21. The plants came very badly away; and, with an unsuitable season, and a stiff clayey undrained soil, the crop was a very poor one.

In 1856 the braird was good and equal. Soon all the bone manures took a decided lead, which they kept till about harvest, when their strength seemed exhausted, and their crops proved deficient. Sown June 11, and weighed Dec. 2. The field is clay, but drained and limed the previous year.

In 1857 the bone manures showed as they did in the previous year, early, but without permanency. The sawdust steeping was an idea of my own, and will be tried next year on a more extensive scale by several farmers. The soil is clay, drained and limed five years ago. Sown June 16, and weighed Dec. 9. An excellent crop, much above the average of the district. In each year the turnips were of the common white globe variety.

THOS. THOMSON.

Millfield, Kelso, Dec. 9, 1857.

REPORT BY JUDGES ON FOWLER'S STEAM-PLOUGH.

The Highland and Agricultural Society's *Premium-Book*, published in February, 1857, contained the following intimation :—

> "For the practical application of steam or water-power to the ploughing or digging of land, £200. The merits of the invention will be tested by its general applicability, by the character of its work, and by its saving in time, labour, and outlay, as compared with horse-power. The inventor must be prepared to deliver his machine at Stirling by the 1st of October, and to put it in practical operation on such farm in the neighbourhood of that town, and to work it for such a period, and under such regulations, as the Directors may determine—the object being to test its capabilities by continued work, and not by a mere show trial."

The utmost pains were taken to make the premium known to implement makers, in the hope of securing competition; and though for some time there was a prospect of this, eventually Mr. John Fowler, jun., 28, Cornhill, London, was the only party who appeared.

The following gentlemen were named as a committee of judges to test the merits of Mr. Fowler's invention, and to determine how far he was deserving of the premium offered: Messrs. John Miller, of Leithen; James Stirling, C.E., Edinburgh; John Dickson, farmer, Saughton Mains; John Finnie, farmer, Swanston; John Gibson, farmer, Woolmet; William Henderson, farmer, Craigarnhall; and Robert Patterson, Offers.

The neighbourhood of Stirling having been fixed for the trial, all local arrangements were left to the supervision of the Stirlingshire Agricultural Society, by whom the farm of Stewarthall, possessed by Mr. William Forrester, was selected as the place, and the 20th of October named as the time for the trial; and it was resolved that, previous to the public being admitted to inspect the operations, they should be privately conducted for at least three days in the presence of the judges exclusively.

Before entering upon a narrative of the proceedings, it may probably not be out of place to describe, generally, the machinery brought forward by Mr. Fowler. It consists of three main parts—viz., *the Plough*, *the Steam-engine* and gearing connected therewith, and *the Anchor*.

The *plough*, which is constructed to turn over four ordinary furrows at the same time, consists of a strong framing about 20 feet in length, supported at the centre on two wheels, one of which travels in the last formed furrow, and the other upon the "land," and by adjustment as to relative heights on these wheels the apparatus is brought into train, and the depth of the furrow to be turned over determined. The two ends of the framing join each other at a considerable angle at the centre, so that when the one end is nearly horizontal and at work, the other is raised at an angle of about 35 degrees, and is thus kept entirely clear of the ground; each end of the framing is supplied with four ordinary plough-heads (share, sock, and mould) closely following each other, and each placed so as to take in and turn over a breadth of 10 inches, or 3 feet 4 inches for the four at each operation. The plough-heads on the two ends of the framing being in every respect reversed to each other, the machine does not require to be turned at the end of the furrow, but by simply elevating the end of the frame last at work, the other end, which balances it, is brought down to working position, and by means of the two carrying-wheels the necessary lateral motion of 3 feet 4 inches is easily and correctly given by the man in charge, and the plough is at once ready for turning over another set of furrows by being pulled in the opposite direction. This pulling is performed in both directions by means of a steel-wire rope of about ¾ inch diameter, passing from the engine at the one end of the field to the anchor at the other end, and back to the engine again.

The *steam-engine* used by Mr. Fowler is a portable one, very similar to those now so much employed in England for thrashing and other agricultural purposes. For greater facility in getting into motion, and stopping, and otherwise for bringing the engine more completely under the control of the engineman, it is fitted with two steam cylinders working on a double crank at right angles to each other, as in locomotive engines. The cylinders and crank-shaft are placed on and fixed to the upper part of the boiler, and the motion is carried down from the crank-shaft by means of an upright shaft fitted with mitre gear and reversing clutches to two drums, upon which the wire ropes are alternately coiled and uncoiled during the operation of ploughing. The drums are placed horizontally under the framing of the engine, and their gearing is so arranged that either can be at pleasure thrown into gear with the upright shaft, so that, while the one is set loose to allow the uncoiling of the wire rope, the other is at work dragging the plough. The drums with the rope partially coiled on have an effective average diameter of about 3 feet, and are 11 inches in breadth each; by means of the connecting gearing already alluded to, the drums are made to take on the wire rope at the rate of from 2¼ to 2¾ inches an hour, equal to about the rate at which the pistons travel. The pistons being 6½ inches diameter, or 33 square inches each in area, and the steam in the boiler being at say 65lbs. per square inch, will exert a tractive strain on the wire rope (allowing a half for loss by friction, &c.) of 2,140 lbs., or nearly one ton. The engine and plough being placed at opposite ends of the field, it is evident that the plough could be drawn towards the engine, and the first set of the furrows turned over, by means of a single rope attached to the plough, and the other end of the rope coiled up on one of the drums of the engine; but to effect the returning draught it is necessary either to employ another engine with the necessary apparatus at the other end of the field, or, by passing another rope also fixed to the plough over a sheave fixed there, and returning and connecting its other end with the second drum of the engine, to work both directions by one engine. This latter plan has been the one adopted by Mr Fowler, and the simple and ingenious apparatus to which the sheave is attachedis termed

The *anchor*. This consists of a strong low wooden frame about 10 feet long and 5 feet broad, supported when in use upon two axles or rollers; on each of which there are two thin-edged wheels or discs of malleable iron, which sink by the weight of the machine to a depth of 8 or 9 inches into the soil: they are prevented from sinking deeper by the bodies of the rollers (about 9 inches in diameter) coming in contact with the surface of the ground, and bearing up the remaining weight. To the framing between the rollers are fixed the bearings of a large horizontal sheave about 4 feet in diameter, around which the wire rope turns when the plough is being drawn away from the engine; the strain thus thrown upon the sheave, which is double the direct strain exerted on the rope by the engine, is resisted by the four discs, which, being placed at right angles to the line of traction of the plough, act like the flukes of four powerful anchors.

It will be apparent that, as the work advances, both the engine and anchor require to be moved slightly forward for every turn of the plough, so as to keep them always in the proper line of traction. This motion in the case of the anchor is ingeniously effected by means of a small capstan or crab attached to the framing, and driven by wheel-work from the large sheave. The engine is provided with a similar apparatus, but it is driven by a direct communication with the gear of the engine. These crabs give motion to their respective machines by slowly coiling up two small wire ropes, the other ends of which are fixed to pawls driven in at suitable points in advance of the machines along the ends of the field.

It may be proper to remark that the engine can be made locomotive, so as to be able to move itself along a road or about the farm without any assistance, and that it can also be so made as to be available as a power for thrashing, or any other work about the farm requiring power, as well as for ploughing. At the same time it is considered that the circumstance of Mr. Fowler's engine not being required to travel the land to be ploughed is a most important feature; and, in the progress of improvement, it may not be far distant when the engine will be enabled to do its work efficiently without the necessity of leaving a corner of the field, and thereby obviate the disadvantage of moving over it.

The trial, as already stated, commenced on the 20th of October, on a grass field consisting of a very stiff tenacious clay, and in a very unfavourable state for ploughing. A considerable extent of ploughing was accomplished, but the greater part of the time was spent in the examination of the various parts of the machinery, and of the mode in which each portion performed its part; and the result of that examination was, that although the judges were of opinion that in one or two minor points the machinery might be improved, the main principle of the apparatus brought forward by Mr. Fowler is correct, and calculated to perform its work in a satisfactory manner. On the 21st of October they had the plough put in operation with the view of testing its power in accomplishing work, and of determining the character of the work itself. The operations were carried on in the same tenacious clay-field, and, upon an experiment of several hours, they found that they might assume the work performed in such time to be about 7 imperial acres in a day of 10 hours: the furrow was in length 330 yards, and about 6 inches deep, and each 10 inches broad, or taking the four plough-heads, the breadth turned over at each operation was 3 feet 4 inches, and the work was very satisfactorily done. The cost appears to be the following: Mr. Fowler states that four men and a boy are required for his apparatus: that the judges found to be sufficient; indeed they think the work might be done by three men and two boys; the daily wages may therefore be assumed at from 13s. to 15s., according to the rate of wages, but say that it is 15s. A horse and cart are required to supply the engine with water, unless in cases where the water may be had in the field; they have, however, to assume this cost in the mean time, and they put it down at 6s. per day. The engine is worked with raw coal, and consumes in the 10 hours what can be obtained at Stirling for 6s., taking the coals at 12s. per ton; oil, and other incidentals, they take at 3s.—making, in all, a daily cost of 30s., exclusive of the tear and wear of the machinery and interest on capital. The judges have not had sufficient experience of the machinery to estimate the cost of the tear and wear, but they think that were they to say 20s. per day it would be sufficient to cover these two items. The total day's cost would in this way be 50s., and assuming the work performed to be 7 acres per day of such land as they found it, the cost would be a little more than 7s. per acre. With the view of testing this as against horse-power ploughing, Mr. Forrester was kind enough to put at the disposal of the judges a plough and pair of horses, but they found that two horses were not equal to the work of a furrow such as Mr. Fowler's plough was turning; according to their own estimate, and that of farmers well acquainted with the working of such land, and with whom they consulted, they are of opinion that such land as they had to do with, and at such a season, could not be turned over by horse-labour under a cost of 15s. per acre. According to this, therefore, there is a clear saving of fully half the cost by Fowler's plough, and the work performed is fully equal to, if not better than, what could be done by horse-labour.

It may by some be apprehended that the allowance for wear and tear is insufficient, in consequence of the liability of the wire-rope to injury from friction on sharp soils; but the risk of this is in a great measure obviated by the facilities for preventing the rope from coming into contact with the ground at all. These facilities are afforded by means of friction-sheaves mounted on small moveable carriages, and these sheaves are in number proportioned to the length of the furrow or undulations of the ground.

The judges having satisfied themselves as to the efficiency of Fowler's steam-plough for the ploughing of stiff tenacious clay-land, they had the whole apparatus removed to another farm, "Boll-for-nought," also in the possession of Mr. Forrester, and on the 22nd of October had the plough tried on a stubble-field of deep alluvial soil. The furrow on this field was considerably shorter than that on the other field, being only 220 yards long; its depth was 7 inches and its breadth 10 inches. In this experiment the quantity turned over was at the rate of nearly 10 acres in the day of 10 hours. The judges expected that the engine would have done more work than that, and probably it could when in continuous operation; but they have stated the quantity as they found it, and it will be kept in view that the short furrow tends to diminish the quantity performed. Assuming the cost per day at 50s., as formerly, the rate per acre would be about 5s.; but, on the other hand, the cost of ploughing the same land with horse power would not greatly exceed, if at all, 8s. per acre. The saving, therefore, on light land cannot be so great as it would be on heavy land—or even steep land, where power is so much required. The ploughing was very well done.

On this field the judges had the apparatus applied to trench-ploughing, and the work performed gave the greatest satisfaction, surpassing anything that could be done with horse-labour. Mr. Fowler, in trench-ploughing, did not use the same plough-frame as he did in the ordinary ploughing; the one employed was fitted up to turn two trench-furrows at each operation—each furrow was turned in two lifts, the upper lift in each case being turned into the bottom of the furrow, and the bottom lift being laid over all; and from the speed at which the plough travels, the subsoil is so completely thrown up and broken, that nothing executed by horse-labour can excel, or perhaps equal it. The trenching, 12½ inches deep, was performed at the rate of about 5¼ acres per day of ten hours, and at a cost, assuming as formerly, of about 9s. per acre.

The experiments, in so far as the judges were concerned, were completed in the afternoon of the 22nd of October, having occupied a period of three days. On the 23rd and 24th the trials were continued for the satisfaction of the public, and it is believed that those who witnessed them were very generally pleased with the result. The agriculturists in the Lothians having expressed a wish to have an opportunity of witnessing the operations, the whole apparatus was removed to the firm of Saughton Mains, near Edinburgh, possessed by Mr. Dickson, and there Mr. Fowler continued his operations for several days, with pretty much the same results. At the same time, it has to be noticed that there were one or two breakages in the machinery, which must have led to some disappointment, but these breakages were not such as to tell against the principle of working as carried out by Mr. Fowler.

Having now described the various trials gone into, the judges are called upon to express the high gratification they experienced in witnessing the performances of Mr. Fowler's plough, and the results achieved by it. They are of opinion that Mr. Fowler has satisfactorily established, that land of a certain description can be well and economically ploughed by steam; and they think it due to him to say that he highly merits the approbation of the agricultural public, for the ability, energy, and ingenuity brought by him to bear on the all-important question of turning the soil. In these circumstances, the judges recommend that the premium of £200 offered by the Society should be awarded to Mr. Fowler. At the same time, they do not desire to hold forth Mr. Fowler's apparatus as faultless; experience will in this, as in all other attempts to apply machinery, suggest improvements, and, indeed, several important modifications have been made by Mr. Fowler since the trials now described terminated; neither would the judges wish it to be inferred from their decision that the apparatus is, in terms of the condition attached to the premium, susceptible of *general application*, as, in its present form, it is not available for land on which large stones are imbedded. Nevertheless, as Mr. Fowler has produced a machine well adapted for stiff clay and loamy soils, and consequently for the very description of land the most oppressive to horses, and the most expensive to work, the judges consider that he has established a good claim, not only to the amount of the premium offered, but to whatever support and encouragement the Society's award can afford; and the judges would hope that this liberal interpretation of the terms in which the premium was offered, will operate as an inducement to others to persevere in their efforts to improve the machinery of the farm.

In conclusion, the judges have to express their acknowledgments to the Stirlingshire Agricultural Society for their arrangements; and to Mr. Forrester for the facilities and assistance he afforded in conducting the experiments, as well as for his great attention and hospitality.

J. MILLER, *Chairman.*
JOHN DICKSON.
JOHN FINNIE.
JOHN GIBSON.
WM. HENDERSON.
RO. PATTERSON.
JAS. STIRLING.

—*Journal of Agriculture.*

THE PLOUGH, OR ITS SUBSTITUTE.

In the concluding portion of our last article we adverted to a point which has often occurred to practical men, namely, that the easy turning over of a regular slice of soil is not all that is desiderated in the action of the plough—that the whole work which we require it to do must be taken into account, and that lightness of draught must not be sacrified at the expence of the disintegration of the soil. It is evident that to scratch or score the surface with two horses must of necessity be done cheaper than obtaining deep culture by the use of eight horses. This refers to the mere doing of the work. But we must go into the question of results, if we wish in the end to ascertain which is the cheapest mode of operation. If where shallow culture is carried out the profits bear a higher ratio to the cost of working than where deep culture is adopted, then by all means adhere to shallow, and discard the deep. But so far as experience points out, the case is exactly the reverse, and everything, nearly, goes in favour of the deep culture. It is evident then, we think, that the mere lessening of the draught of the plough is not all we want, unless this lessening of draught is taken into consideration together with the peculiar state of the soil which experience points out as the best fitted for our purposes.

But supposing us to obtain a form of mouldboard that gives more disintegration of the soil, and requires less power to work it, than that of any plough yet introduced, we have still a difficulty to overcome, which we have shown to be attendant upon the action of every plough—namely, the formation of the hard crust formed by the passing of the sole of the plough over the soil. There can be no question that this is a serious evil. How to overcome it, is a problem occupying the attention of not a few of our agricultural mechanics. Rollers, on which the sole is to run, have been proposed; but although these will tend to mitigate the evil, they will by no means get rid of it. Revolving tines, like those of the Norwegian harrow, have also been suggested to follow immediately upon the action of the plough, and tear up the surface on which the sole has been resting. But in the attempt to combine two or more operations in one machine or implement there is always danger either of obtaining work partly done, or getting the work done, if it so happens that it is good, at a dearer rate than it could be performed by two machines or implements, each having its own task to perform. Our manufacturers know this, and almost invariably act upon it. They have their machines of preparation as we may term them, and their finishing machines; each machine, however complicated, doing its own work preparatory to that which is to succeed it. And in directing our attention to what has been done in agriculture, we find that the nobleman who has made his name famous in connection with indubitably successful deep culture, has followed the same principle. Thus, convinced of the advantages of a deeply pulverized soil, he has by dint of experimental research discovered a form of subsoil trench-plough, in which a peculiar and simple member acts upon the soil—*left untouched* by the plough of an ordinary principle of construction, but capable of taking a furrow of much greater depth than is ordinarily effected—so as to completely disintegrate it. But although this subsoil trench-plough, as it is called, follows immediately upon the action of the plough, the two implements are not combined in one, with eight horses working the combined implement; but each implement does its own work, having each its own complement of four horses. And this arrangement has doubtless been adopted after mature consideration, and from a conviction that the work would be cheaper and better done than with the use of a combined implement. But apart from this consideration—the utility or non-utility of the combination of two principles of action in one implement—the question forces itself upon our notice, What necessity is there for the plough, in both of those plans above noticed, forming part of the mechanism employed?

Grant that by the use of revolving tines following close upon the action, and forming part of the mechanism of the plough, we completely obviate the hard crust, and that by the use of the "subsoil trench plough," with its peculiar member we obtain a pulverized soil to a depth of nineteen to twenty inches. Although in this latter case it will be seen that we still reach a limit beyond which the pulverization ceases, and the hard crust begins; and that, although a deep soil with a hard crust is better than a shallow one with the same obstruction, there is no reason why the depth should be *limited* to 20 inches any more than it should be carried out to six only, as some hold—granting so much, would it not be cheaper to employ mechanism that would at once give us a pulverized soil, the depth of which could be regulated at will, and at any point of which there would be no hard sole or crust similar to that formed by the plough? And which, in fact, is a practical limitation of the depth. Is it positively an essential to good cultivation, that the soil must *be laid over in regular slices*, and that the weeds, leaves, &c. *must be buried* under the surface? Spade husbandry is *said* by nearly all to be the most efficient; yet the spade does not lay the soil over, as the plough does; neither as a necessity of its mode of operation is *all* the surface matter buried by its use; and most assuredly it forms no hard crust, on which water may lodge, or through which the roots of plants may with difficulty penetrate. That it effectually turns over the soil, and leaves it in a condition fit for the action of the atmosphere, is admitted by all. A careful observer, uninfluenced by the force of habit or the trammels of preconceived notions, would be inclined therefore to ask, Why is not this system of cultivation carried out? And if met by the objection that from the dearness of manual labour the expense would practically be prohibitive of its adoption, the answer—in view of what mechanism has effected—would naturally occur to him that this was simply a question of economy, which could be solved by introducing some kind of mechanism, when the same cultural results could be obtained as by the use of the spade, and at a rate which would render the operation a paying one. But on pushing inquiries further, our observer would find unanimity of opinion in reference to the value of spade husbandry merely nominal. For while many *say* that it assuredly is the most effectual mode of cultivation, it is notorious that they act as if they did not believe it; and so far from there being an unanimity of opinion on the point, we find a great diversity, so far at least as the application of the spade to *farming purposes* is concerned; for it may to some appear strange that, while admitted to be available for gardening purposes, and productive of good results there, it is not so for the farm.

Before asking our agricultural mechanics, then, either to improve the present plough or to invent a substitute for it, it seems but fair that agriculturists should decide as to the peculiar state in which it is desired to have the soil—Whether ploughing, in short, is essential. Or whether simple disintegration is only required—the state in which the surface is left, or its peculiar finish, being a matter of trifling or of no importance. Let it be understood that a good implement *must* give two things—(1), a well-stirred soil, with a depth easily regulated—knowing no practical limit, so far as the action of the implement is concerned)—and (2), a laying over of the soil so stirred or moved at a determinate angle, forming a furrowed surface. Or, on the other hand, that that which is wanted from the implement is simply one thing—that it shall give us the soil well stirred and disintegrated, without reference to the way in which the surface is finished. Let the agriculturist say what he wants, and we have so much faith in the ability of our mechanicians as to believe that they will be able to introduce something that will supply the want. It is not fair to the mechanic, nor is it good policy on the part of the agriculturist, for the latter to throw on the shoulders of the former the double onus of ascertaining what has to be done, and how he is to do it. The best and quickest way of arriving at the solution of the difficulty will be to combine the knowledge of the farmer with the skill of the mechanic. Each aiding the other with the knowledge which long experience in their occupations has given, we may hope to see a machine or implement introduced which will, with no hesitation or doubt on the part of the farmer, be accepted as performing all that he requires.

The settlement of what is wanted is the first thing that must be done, if true progress is wished for. So long as we find two great parties—each holding opinions nearly, if not totally, irreconcilable—so long will we find that the efforts of our mechanicians will be frittered away. It is hard to believe that both opinions can be right. Grant that one is wrong, and it is evident that all the efforts of our mechanicians to meet its requirements must be simply lost time, and must incur a needless expenditure of money. Better far to decide on the way we have to go, and secure the aid of our mechanicians to help us on in our journey. We shall, at least, have the benefit of united effort. The points of the question to be decided present features of momentous interest to the nation at large. We are, if we read the signs of the times aright, on the verge of the extended use of a new power, which in other branches of our national economy has effected amazing wonders; and in view of this probable use of a new power, we are afforded a most fitting opportunity of inquiry as to whether the old implement of culture is adapted to it. We have many lessons given to us, in the history of the progress of other branches of our arts, to make us pause to give this inquiry full weight. In the early days of the power of steam, we find that it gave out its wondrous might through the clumsy medium of Newcomen's atmospheric engine; but the genius of Watt saw that it could only put forth all its majesty through the agency of mechanism adapted to *all* its peculiarities. When the ambition of a Symington or a Fulton prompted the application of steam to the propulsion of vessels, with the power of man they discarded his time-honoured implement the oar, and yoked the giant to the whirling paddle-wheel.

We have, at all events, arrived at a point affording full facilities to an exhaustive inquiry, as to whether the time-honoured plough is the fittest instrument of cultivation. No longer do we find those who uphold it as perfect. It has acknowledged defects, acknowledged even by those who maintain that it is, nevertheless, the best implement we can have. And if we find that any modification of its mechanism, by which these defects are obviated, brings about a condition of soil much resembling that effected by other implements not possessing the peculiar features of action of the plough, then the question will be brought nearer to that point where it narrows itself to one of comparative economy in working of different implements, no matter what their distinctive peculiarities may be. That the plough must be modified, to enable it to do the work demanded by a more comprehensive system of cultivation, is obvious enough; and that these modifications will tend to bring its operation nearer to that of implements or machines which by many are considered at present altogether heterodox in principle, not a few are inclined to think. Chief among the influences which will necessitate these modifications will be the power of steam

A PLAIN FARMER'S VIEWS OF THE NEW THINGS IN AGRICULTURE.

Hanson's Potato Digger, made by Coleman of Chelmsford.—This is the *newest* implement of note I have seen, and, I see, is called "the implement of the season." It consists of a frame of wood in shape something like the Ducie-drag frame, but longer, and is supported upon two large-sized and strong carriage wheels of wood, with a pair of small iron steerage-wheels in front, wide enough to bestride the potato ridge. These are attached to an upright stem formed as a circular rack, allowing the wheels to be swivelled, and also permits it to be raised or lowered by means of a pinion and winch, and fastened by a pin through the rack. Underneath the hind-part of the frame a strong bracket carries, by the share-stalk, a curved triangular share or cutting spade (a hodding spade) which passes in a nearly horizontal position under the potato-rows, raising up the whole mass for the freer operation of the revolving forks. These consist of a disc of eight two-tined arms or forks on a horizontal shaft, made to rotate transversely behind the machine: this shaft is actuated by means of two mitre wheels, one on the shaft and the other on the axle of the driving carriage wheels, both nicely covered or boxed in. These wheels set the whole in motion by reversing a cam placed in front of axle, and thus permitting the machine to travel when not in work. The wheels are armed with pegs of iron, in a wedge form, to prevent slipping in work. To allow the disc to be set higher or lower there is an adjustment behind for that purpose, and the forward end of the shaft works in a moveable socket bearing on the axle of the carriage wheels. The machine is cleverly contrived and does the manufacturer great credit. I objected to the size and coal-shoot form of the share: its very form causes it to clog in work, of course adding greatly to the draught. We see no reason for such an immense share for such a simple purpose. A common curved coulter with such a share-stalk would, I think, do better. The share is certainly a very clumsy one; and I hope, when I next see the machine in work, to find a great improvement in this particular. I think it a mistake to suppose it is requisite for the row to pass into this shoe or share, and from thence to be thrown abroad by the revolving forks: this is not necessary. The revolving forks work at such a speed that nothing more is required than simply to raise the row to ensure its being thrown abroad with great facility; the instant it is raised the forks seize it and all is instantly thrown out for convenient picking. I have repeatedly seen it at work, and such is its power that no trifling obstruction can interfere with its proper working. It cannot on all soils, as now arranged, be fairly worked by two horses; it mostly requires three, on stiff soils, to get forward with expedition. The whole row of potatoes, haulm, and soil are thrown out and scattered almost inconveniently far abroad; so that in some cases a screen to prevent this is attached to the side by an apparatus for that purpose. I worked one of these machines on my own farm, in the past season, and was much pleased with the result; for in addition to the dispersion of the potatoes by the forks, the soil itself received a good pulverization, and all roots and rubbish were thrown out on the surface; thus saving the cost of a subsequent harrowing and other labour. I do not hesitate to assert that, with some modification, it is a highly useful implement, and will come into general service.

Crank-axle Carts.—I will next make a remark or two upon this new feature in our carriage-department of agriculture. The Royal Agricultural Society offered a prize for the best cart with crank-axle, to be decided at the Salisbury Meeting. I took pleasure in examining the carts shown in competition; but for general-purpose carts I speedily descried they were inadmissible. The long shafts I approved, as giving the horse more power over the carriage. The high wheels (which the cranked axles were designed to accommodate) are undoubtedly advantageous in point of draught; but they appeared to me to be disadvantageous in other respects. The shelvings could not be prevented pressing on the wheels under a heavy burden. The usual height of a common cart-wheel is about 4½ feet. In these carts the diameter is six feet, and some even more. In loading, there must be inconvenience from the height of the sides, and in unloading, too; for take the tipping, the low cranked axle cannot permit the cart-body a sufficient incline to slip out the load behind, and the bottom is so low that over many of the roads in my neighbourhood they could not travel, in consequence of the depth of the ruts. The axle itself would slide on the surface. Then again, their large wheels would continually throw into the body of the cart such soil or mud as adhered to them, unless prevented by high shelving boards. The principal advantage that I could discover was that it is almost impossible to overturn them; the load is so low, resting almost between the wheels; and their light draught upon hard level roads—these are great advantages.

MOWING AND REAPING MACHINES.

Although this class of machines is not decidedly new, yet some of them have undergone such extensive and recent alterations as almost to constitute them new machines. It is with such that I have to do, and that very briefly. Perhaps I shall not be in great error if I consider and treat mowing machines as *new machines.*

MOWING MACHINES.—*Caryl's American Eagle Mowing Machine.*—The admirable way in which this machine cut the clover crop at Salisbury quite took me by surprise. I at once pronounced it to be the best of its kind hitherto produced, and the awards of the various prizes which have been conferred upon it since have fully borne out my impression. The machine is in most respects similar to our common reaping machines, both in frame and the position of the cutters; but in its more minute details it varies considerably. The most singular adjustment in it is its first moving or motive power. It is communicated from the axle of this most unique of all wheels. This wheel is made of cast-iron, is 3 ft. 7 in. diameter, and the rim is 11 in. broad. Throughout its periphery, and parting as it were what seems a solid cast-iron rim into two parts or slots, making a series of zig-zags or curves, which, alternately opening and closing, act as cams, and passing over or by a ball or roller attached to the cutter-bar, gives it that quick vibratory motion so requisite to cleanly cutting. The rapidity of the movement, and its singularity, is very striking, quite doing away with spur-wheels, cranks, or pinions to work the cutters. The whole is under the control of the workman, the frame being so nicely balanced that, by a movement of his foot, he can instantly raise or depress the knives, to prevent obstruction from a surface-drain or uneven ground. "The knives are acute, not serrated, and slide above fixed sharp fingers, having thus a clipping or shearing action; they are kept close and free from clogging by a spring pressure-bar, and each knife may be unscrewed off and renewed at pleasure. The length of the vibration is only 2 in., and the motion comparatively slow." The extreme length of cut is 5 feet. The machine is of simple construction, being small, compact, and light, and of easy draught; and when used as a mower there is not a cog-wheel in the machine. It is also adapted for reaping corn, by the addition of a curved platform; and a radial arm sweeps, by an ingenious arrangement, backward and forward over the platform, alternately lifting and letting fall a rake, which receives and delivers a bundle of corn at every 3½ feet; or the attendant can retain it longer upon the platform, according to the crop, at his pleasure. Its weight as a mower is about 6¾ cwt., as a reaper near 8 cwt.; its width, 8 ft. 3 in.

I have not seen this machine at work as a reaper, and my impression is unfavourable as to its capabilities in that respect, from the manifest reluctance the managers show to give it a fair trial in a corn-field; but as a mowing machine in moderate crops of grass or seeds it is beyond praise. The work done is so evenly cut, and so nicely distributed over the land, as to defy the competition of the best haymakers. In heavy crops of grass I observed the driving-wheel was occasionally clogged by accumulating grass or old fog around it, so as to prevent its turning; this, however, was soon relieved by backing the machine. The knives, too, were occasionally obstructed by hard or woolley fog—i. e., last year's uncut decaying grass. This, however, will often stop the most expert "mow-men." I merely observe, that I entertain a high opinion of the efficiency and general usefulness of this machine, and believe it will ultimately obtain great public favour.

Dray and Co.'s Hussey's Mowing Machine.—*Mowing Machine as improved by Dray and Co.*—This machine, so far as my observation goes, is identical with their reaper, minus the tipping platform and facilities for the delivery of corn. This is all right. I like a convertible machine; and this one certainly cuts grass and seed-crops in very good style indeed. It is somewhat smaller than the Eagle machine. The acute skeleton knives cut admirably. I have repeatedly seen this work both as a mower and reaper, and, although from its greater draught whilst taking less work, I cannot class it as equal with the Eagle machine; yet it is certainly next to it as a mower, and the price is less, they being £35 and £26 respectively. It is well worthy encouragement.

Lord Kinnaird's McCormick's Mowing Machine.—This machine is, I think, very nearly identical with his reaper, being also minus the endless web and the other apparatus for the side-delivery of corn. I saw it mowing clover and grass at Salisbury; the former it did very well, but the heavy grass crop and surface drains prevented a fair trial as a grass mower, which, in fair even work, it would cut very well. It is much larger, and takes a wider space than either of the above. The price low—£21. As a mowing machine, the breadth taken is against its cleanly working.

Mazier's Little French Machine.—I have seen this machine tried in both departments of mowing, neither of which it would effect with economy. It is a compact little thing, but for our go-a-head farmers it will never do; they require a machine of greater capacity. It is also merely by being deprived of its many chains for side-delivery of corn, that it forms a mowing machine. It takes a limited breadth.

Reaping Machines.—In this department of manufacture we have a great increase, and many improvements. The first I shall name is *Burgess and Key's Reaper*. This machine is fitted with M'Cormick's well-known cutters. The great novelty is the addition of a newly-invented conical screw-divider. This is a large peculiar-shaped roller, like a pavior's rammer, which, revolving as it passes along, readily divides the upstanding corn, and lifts up the lodged for cutting. This is a decided improvement upon the divider-board, which tears its way through the crop, pulling up some and breaking off others, by which portions of the crop are lost. The gradually insinuating screw separates the corn without difficulty, and with less labour to the horses; and scarcely any is dropped. The screw-roller delivery-platform is much as I have heretofore seen it, but I thought the width taken rather larger than past years—*i. e.*, 5 ft. 6 in.; but the labour to which the horses are put is not excessive.

Crosskill's Bell's Reaper.—This reaper has undergone several improvements. It is the most useful and convertible of all the reapers. The propulsion being from behind, it can charge into the crop at any point. The cutting-bars immediately precede the horses, thus dispensing with the side draught. The endless web is so contrived that it can lay the corn in a continuous swathe on either side of the machine, thus opening a way for it to pass up and down the field at all times close to its work. It takes a breadth of 6 ft. 9 in., which is very great; indeed so great, that two horses cannot readily work it. The machine itself, although reduced in size, is still too large and heavy.

Dray and Co.'s "Hussey."—This machine has not undergone any material improvement during the past year, except its convertibility into a mowing machine. The tipping platform is a decided improvement, but it is not a very recent invention. The delivery is behind, which is a great hindrance in work, as the corn must be gathered before it can take a fresh bout. It is the most compact and lightest reaper we have, and cuts admirably.

Palmer's Union Reaper.—I have frequently seen this machine in work; all is done in a truly business-like manner. The large curved platform has a singular appearance, and is provided with rollers to assist the rakeman to effect a good side delivery. I did not observe anything essentially new this season, and to which I am trying to confine myself.

Lord Kinnaird's Reaper.—This is the cheapest I have seen, and works well. It would be rather more attractive if improved in its manufacture. His lordship has studied economy to a fault.

Wray's Reaper.—This is a one-horse machine, and came out for competition at the York meeting. It is similar in form to "Hussey's Machine," and has also a similar back delivery. The novelty to be noticed in this machine is the ingenious arrangement of its cutters, or rather in its series of knives. These consist of an endless band or series of cutting edges, in fact an endless knife, which in passing very rapidly across in front, and revolving freely from beneath the frame, cuts its way in a very business-like manner. The band revolves by means of two horizontal wheels, one on each side of the frame. In work, it appeared necessary that the pace should be quick, otherwise it did not cut well, and symptoms of clogging were manifest; and this clogging was a serious obstruction, as it was not readily relieved. I saw it tried thrice at York; and although the pace was severe, yet the draught in cutting a breadth of 3 ft. 6 in. was not very great for the *one horse*. Undoubtedly the endless knife contributed much to lessen the draught, of course, there being less friction than from the vibrating motion of other machines. I was pleased with the machine and its working as a whole, and believe it to possess many points of great usefulness. I wish it every success. The price, £30, is rather high.

MANUFACTURED CATTLE FOOD, *i. e.*, THORLEY'S FOOD FOR CATTLE — BRADLEY'S FOOD FOR CATTLE.

The manufacture of food for cattle is certainly by no means *new;* but as we find our agricultural papers teeming with advertisements of "Food for Cattle," I am tempted to look a little into the matter. I do not pretend to inquire into the mysteries of the food prepared by *Joseph Thorley, Esq.*, or Mr. Bradley, and others; but as these preparations of food are obtaining considerable notoriety, if not popularity, I may be pardoned for classing them amongst the new things in agriculture, and briefly alluding to them as such.

The great and very important subject which is here involved is that of *animal nutrition.* Now as this is a subject upon which I am free to confess great ignorance, I hope to be excused making copious extracts from a work now before me, and which ought to be in the hands of every intelligent farmer—"Morton's Cyclopædia of Agriculture." The article written by Professor Voelcker is a very talented and instructive one. He says—

> No scientific investigation in which the animal physiologist engages is more intimately connected with the successful practice of farming than the inquiry into the processes of nutrition. On the views we entertain with regard to the theory of nutrition not only depends our success in breeding and rearing stock and the fattening of animals, but also the economic management and application of farm-yard manure. The greatest interest and highest practical importance, therefore, belong to the beautiful researches with which Mulder, Boussingault, Dumas, and particularly Liebig, have made us acquainted. We are bound to acknowledge with gratitude the services already rendered by these and other philosophers, who have endeavoured to determine experimentally the relative value of the different articles of food, and to throw light on the still mysterious process of nutrition. The bodies of animals consist principally of the following parts, the composition of which we must briefly consider: The flesh, or muscles; the blood; the fat; the skin, hair, or wool.
>
> The fleshy parts, or muscles, of animals consist principally of muscular fibre, and contain, besides, cellular tissue, nervous substance, blood and lymphatic vessels, and an acid juice. In this juice is found a peculiar organic base, called kreotine, also lactic and inosinic acid, albumen, the sapid or taste-giving ingredients of flesh, and inorganic matter, principally salts of potash and phosphates of lime and magnesia.
>
> Chemically considered, animal bodies may thus be represented as consisting of—
>
> 1st. Organic matters free from nitrogen (fat).
> 2nd. Organic substances rich in nitrogen (fibrin, albumen, &c.).
> 3rd. Inorganic salts (chloride of sodium, phosphate of lime, salts of potash).
> 4th. Water.
>
> These constituents the animal can only have derived from the food with which it is fed, or from the air, in which a portion at least of the organic elements occur; but as we all know that life is not supported by air, the food naturally is regarded as the source from which the constituent parts of the animal body are derived.

Professor Playfair, in another part of this valuable work on diet, says—

> All food may be divided into three groups:—
>
> 1st. Flesh-forming substances.
> 2nd. Heat-giving ingredients.
> 3rd. Mineral matter for the production of bones and inorganic ingredients of flesh and blood.
>
> These three groups exist in all kinds of vegetable food adapted for the nutrition of animals. It is therefore easy to tabulate the principal substances used for human nutrition, so as to show their relative value.

A part of which I extract, as showing the composition 100 parts o food as it occurs in commerce—

CONSTITUENTS OF THE PRINCIPAL SUBSTANCES USED FOR HUMAN NUTRITION.

Name of food.	Flesh-forming matter.	Heat-giving matter.	Mineral matter.	Carbon.
Wheat flour ..	17·00	66·00	0·70	45·50
Buckwheat	8·58	74·03	2·20	37·61
Barley meal ..	14·08	68·50	2·80	40·50
Oatmeal	13·60	70·30	3·30	44·10
Indian meal ..	10·71	75·25	1·04	36·41
Rye...........	13·83	71·43	1·74	38·27
Rice..........	5·43	84·65	0·52	36·00
Peas..........	23·40	60·00	2·50	35·70
Beans	23·00	58·50	3·40	38·24
Lentils	25·00	58·76	2·24	37·28
Potatoes	1·41	22·10	1·00	12·20
Carrots	1·48	11·61	0·81	5·40
Turnips	1·64	10·00	0·62	5·20
Parsnips	2·10	17·70	0·80	8·68
Mangel-wurzel	1·60	12·26	1·14	5·50
Cabbage	1·75	4·05	2·20	2·65
Cocoa-nuts ...	9·56	85·76	2·70	68·56
Sugar	0·00	100·00	0·00	42·58
Beer	0·85	9·17	0·20	4·33

The column exhibiting the amount of flesh-forming principles in the food is a very close approximation to the true nutritive value.

I have taken these extracts with the view of showing that in the hands of a good practical chemist a preparation or compound of ingredients made from the above articles of food named, and other sources, may constitute one of our most valuable resources for the fattening of cattle and the nutrition of other animals. I am generous enough to give Messrs. Thorley, Bradley, and others, credit for making the attempt to provide for this *want* in our new order of things. I regret that just at this moment I cannot lay my hand upon any analysis of the locust or Carib bean, which is so generally well spoken of, as adding nutritive value to many compounds. I presume these manufacturers of cattle food well know its value; for if one might judge from olfactory examination, it forms no inconsiderable portion of their mixtures. I find no fault with their prepared or "invented" food, their "invaluable compound" "invented by the sole proprietor," &c.: I believe them to be good and serviceable; all I desire is to guard my brother-farmers against "paying too much for their whistle." Thorley's Food is sold in cases containing 448 packages, each package one feed, at a cost of 56s. per case, or the same quantity in casks at 50s. Bradley sells his horse and cattle food at 42s. per cwt., and his pig food at 24s. per cwt. Mr. Thorley does not give us the weight of his packages. I am now purchasing barley-meal at 10s. 6d. per cwt., the best linseed-cake at 10s. 6d. per cwt., and Carib beans at 8s. 6d. per cwt. These are really great contrasts in price; but of course I do not compare their relative values with *these new things in agriculture;* in fact I know nothing about them, more particularly as to their composition. Those samples coming under my examination appeared to consist of a rather coarse flour of a yellowish colour, having the peculiar rancid smell of the Carib bean alluded to above. I have no doubt whatever that a judicious admixture of Indian corn-meal (maize), barley, bean, pea, or oat meals, together with Carib bean or linseed-meal, and similar substances, does constitute a good article of food, of highly nutritious and fattening quality. My aim in forwarding this paper will be fully answered if it should lead any of your readers to make full inquiry as to th nature of these kinds of food, and their value, befor making their purchases.

MILK.

[TRANSLATED FROM THE FRENCH.]

ORDINARY MILK—THE MILK OF SPAYED COWS.

Notwithstanding the important place milk occupies as an article of diet, nothing is more common than milk of poor quality. The conditions under which milk is produced explain the rareness of good milk.

If we examine the milk of a certain number of cows in the country, we find united, 1st, the milk of cows that calved ten, fifteen, twenty, or thirty days previous (*). 2nd. The milk of cows in heat, and essentially prejudicial to health. 3rd. The milk of cows with calf (†). 4th, and as an exception. A small quantity of good milk—that is, milk from cows that have calved five or six weeks previous, and which are neither in heat nor in a state of gestation. It is therefore seen that milk is in most part of mediocre quality, or of a nature unfavourable in respect to hygiene: and yet this milk, furnished by farmers, surpasses by far the milk from cows kept in stables in the city.

The condition under which cows in city stables are kept produces another cause, grave, serious, which greatly adds to the poor quality of milk above designated—we mean pulmonary consumption, by which a large number of cows are attacked. Has it not been stated, in fact, by veterinary physicians, that one-half at least of the cows kept in stables in Paris are phthisical?

Is it not evident that such milk is not only deprived of its nutritive qualities, but is very injurious to health? and the water, which in the retail is added to this milk, assuredly does not redeem the original vices.

In regard to the alterations in milk arising from the manner in which the cows producing it are kept, it is difficult to estimate them, otherwise than by their taste. As to milk diluted with water, consumers can easily prove this fraud. A first means consists in the employment of a small instrument, simple and of small cost, called galactometer or milk weigher. Plunged into the milk, it indicates exactly, by its divisions, the quantity of water which has been added, whether a quarter, or a third, or a half; for it is not rare that milk is diluted in the latter proportion! Or a certain quantity of milk may be left, to remain for six or eight hours, in a cylindrical glass vase called a gauge, or in an ordinary glass: after this lapse of time, the cream which has risen to the surface, and which is distinguished by its colour, reveals by its thickness, and still more by the resistance it presents on touching it, the butter quality of the milk, that is, its richness in the principles proper for the extraction of butter.

In the establishment we have founded in Paris under the name of "*Dock modele de la vie a bon marche* (‡)," the trade in milk has extended considerably. Although the *Dock* delivers to consumers milk which is obtained from the country only, and rejects the milk which *turns* in the operation of boiling, it is often complained that the milk bought of the *Dock* has turned. We will take this opportunity to observe, that the best and purest milk will turn under the influence of a change of temperature, improper care, and the employment of an improper pan or vase, etc. (§); that the administration of the *Dock* might prevent the decomposition, accidental moreover, of its milk by adding water, or the bicarbonate of soda; but this establishment, limiting itself to selling pure milk, leaves it to the consumer to add these articles.

As it is in bad spirit to indicate an evil without pointing out the remedy; and, having proved the poor and often bad qualities of ordinary milk, we are happy to speak of milk of an excellent quality, which is yet unknown to consumers, and of which the *Dock modele de la vie a bon marche* has the honour of popularising the use.

THE MILK OF SPAYED COWS.

This milk is produced from cows which, after the fifth or sixth gestation, and five or six weeks after calving, undergo an operation which consists in the ablation of the ovaries, thus rendering the cows henceforth incapable of reproduction (*). From this time, as happens in regard to the ox, the animal changes in nature, and its milk, which we have named milk of spayed (*lait de beuvonnes*), is free from all perturbations. The spayed cow does not undergo those disturbances arising from being in heat, from gestation, and parturition; she is free from those causes which produce such evil effects in the quality of milk.

In this new condition of the cow her milk becomes regulated, and—which is important to the farmer—lactation is maintained in full quantity for a year at least, and is prolonged, diminishing in quantity but increasing in quality, two and even three years, when she is not too old and is properly kept. When lactation has ceased, the cow, which has, by a quiet and reposed life, become considerably increased in flesh, may be delivered to the butcher in perfect condition, and the meat is superior to that of ordinary cows. By generalising the spaying of cows after the fifth or sixth gestation, there would be introduced into common use milk of an irreproachable quality.

The milk of spayed cows gives more cream than ordinary milk; it is also richer in casein, which constitutes—a fact generally unknown—the most nourishing part of milk. Hence the superior quality of the milk. The butter extracted directly from the milk is delicious in taste: it testifies to the amount and richness of the casein it contains. This milk offers precious resources for the artificial nursing of infants: it might be asserted that they will be better nourished; for the nourishment of infants, who give it the preference over other milk (†), we do not doubt that the milk of spayed cows will be principally used.

Such is the milk which the *Dock de la vie a bon marche* now introduces for consumption.

This milk, the production of which for a long time yet will be far from meeting the wants of those who appreciate its excellent qualities, sells for a higher price than ordinary milk; for it is necessary to pay a higher price to the farmer either to overcome, by the advantage offered them, the resistance which routine always opposes to the best discoveries, or to compensate for the risk of mortality which the cow undergoes in the operation of spaying.

If, as we doubt not, the milk of spayed cows takes the place in domestic economy it should occupy, the *Dock* is assured of satisfying gradually the exigencies of the consumption, by the numerous operations it is causing to be made from the present time.

DELAMARRE,
Proprietor of the Dock modele de la vie a bon marche.

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[*] It is known that cows' milk is not good for domestic use till a month or five weeks after calving; and it is well known that farmers put away their calves eight or ten days after birth.

[†] This milk generally predominates, as it is common to milk into the sixth and even into the seventh month of gestation.

[‡] Rue de Croissant, No. 44, Paris.

[§] One precaution we would recommend; that is, to avoid placing the milk over a blazing fire, but to submit it to the action of a mild fire.

[*] The spaying of cows was known in remote antiquity. In modern times the practice of this operation, with the design of increasing the quality of the milk of cows, dates back but about twenty-five years. It was applied with advantage in the production of milk in 1830, by Mr. Winn, of Natchez, Mississippi, U. S.; but Mr. Winn and his successors proceeded by the cesarian operation, which presented serious difficulties, and was often followed by the death of the animal. At the present time, by a proceeding recently discovered, a skilful veterinary surgeon, M. Charlier, executes this operation without an external incision, and renders the chances of mortality much less.

[†] All persons who are in the habit of tasting milk, readily recognize the milk of spayed cows by its more unctuous and sweeter taste.

STALL FEEDING OF CATTLE.

The recent discussions in the Farmers' Club House in London on the subject of farm buildings, and more especially of the parts that are destined to accommodate the fattening of cattle, having terminated in no special adoption or recommendation on that point, I am induced to make a few observations on the subject, as it is a part of arrangement of a very chief importance in the designing of improved farmeries. I have ever been of opinion that open yards with shelter sheds form the best accommodation for fatting animals, and I perceive that Mr. Baker, of Writtle, is of the same opinion, after all that has been spoken and written on the subject. I am pleased with Mr. Baker's judgment, as his authority weighs heavily on all points of enlightened agriculture. It is impossible to see what advantage an animal confined in a box or single stall can enjoy over two, three, or four together in an open yard provided with a shelter shed, racks for straw, and cribs for roots. I remember having seen, nearly thirty years ago, a feeding shed with single boxes, on the farm of Wark, near Coldstream, on the English side of the Tweed, which was designed and used by the celebrated Culleys, who for a long time flourished on that farm. The turnips were given to the animal through a spout-hole in the front wall, and the space barely allowed the beast to turn round, who could enjoy no exercise. The position was dull, cold, and uncomfortable, and the plan never advanced into use, and was not approved even on the farm where it was seen.

Two of the largest-sized animals of any breed are most beneficially provided in an open yard with a shelter shed, and three or four of the medium-sized will do equally well in that accommodation. The aspect of the yards must front the southern hemisphere, and be shone upon by the sun during some hours of the day. When filled with meat, the beasts lie down and bask in the yard in fine weather; and during rains and storms, retire into the shed, and repose undisturbed and under shelter. In wet and stormy countries, it will be advantageous that the animals eat under cover of the shed, and for this purpose it is contrived that a railway runs along the wall of the sheds, and discharges the turnips through spout-holes in the wall into the cribs placed in the shed; but in most cases the roots are placed in cribs with latticed bottoms, and the straw in an open rack.

Two, three, or four beasts of any size are most conveniently fattened in this way; but with Scotch cattle a different arrangement is required. The larger breeds may be treated as English cattle; but the small beasts, called Kyloe or the West Highland cattle, of which there are several varieties, are so very restless in temper and pugnacious in disposition, that the tying system in stalls becomes eligible, and even imperatively necessary. These animals require to be wintered for two years—the first, they may run in an open yard and shed in six, eight, or ten together, and be half fattened on untopped turnips and straws in racks; the second, the beasts are tied to stalls in double trevises, and are fully fed with topped turnips, beginning in November, and will be finished in March and April. The very small Highland cattle may be fattened in yards, but the Argyle and Dunrobie breeds require to be tied in stalls. And with this view every feeding farm should be provided with a fattening shed along with the open yards for the purpose.

A yard, including the shed, of 60, 70, or 80 feet long and 30 wide, will accommodate 2, 3, or 4 beasts, as it may be built. The shed is 20 feet wide, and has a square front opening of 12 feet. The bottom slopes outwards, in order to provide a dry bed, by discharging all moisture to the yard; the roof is filled with loose straw from the level of the walls to the top ridge, supported by beams apart at the necessary distances. This filling prevents the cold of the otherwise empty space; and the openings of the loose straw allows the passage of air, without the close confinement of a ceiled roof. The bottom of the yards slopes to the gateway in the interior of the farmery, to which the urine falls, and escapes in an open gutter to the south front of the farmery, where, being received by an iron grate into a covered drain, it is conveyed to a tank, and absorbed by earths, or prepared as liquid manure. But the strawy litter of the yards will in most cases absorb all the urinary fæces; and, after all that has been said and written on the subject of liquid manure, the best use of it is in that way. I have for many years advocated the cutting into short lengths of all straws used for litter; that the yards be thinly and frequently strewn with the cut straw; and that mixed excrements be all lifted and carried in a fresh condition to the prepared land for turnips, be covered in broadcast by one ploughing, and subsequently mixed with the soil by the workings of Finlayson's harrow lengthwise and crosswise. Fresh dung is superior in effect to the mixen of fermented heaps: the specific caloric, or animal heat, of freshly voided fæces is much more efficacious than the production of artificial fermentation. Whatever the cause may be, the fact is certain.

The proposed design of roofing over the entire farmery, like the terminus of a railway, may not be eligible for the purposes of agriculture. The exclusion of the rays of the sun will render the whole area cold and ungenial; and it seems necessary that the warmth of that luminary be applied to all objects of organized life. An open yard, for necessary heat and occasional exercise, with a shed, to which to retire for shelter from rains and storms, appears to be the best arrangement that has yet occurred.

The very superior quality of the turnips and the straws over Scotland and the North of England fattens into prime beef the cattle of these countries, and no variety of food is ever proposed. In South Britain other kinds of food are used, which require boxes to be placed in the yards or sheds, from which the beasts can eat the meat. The shed may afford a cover for that purpose.

The piggery and poultry yards are best in being wholly disjoined from the farmery, and placed on some side of it, or in the south front, as the walls are low, and the buildings will not exclude the sun from the yards that are behind. An excellent yard for store pigs may adjoin the stable, where the strawy litter, with hot fæces of the horse, affords a most agreeable bed to the swine; and a valuable manure is compounded with the cold and saponaceous excrements of the pig with the dry and hot fæces of the horse. The winter food may be roots and raw potatoes; and during summer, clovers and vetches. The animals will be in good readiness to be transferred to the feeding-sties of the piggery, wherein, two together, the fattening process is finished for bacon.

J. D.

THE SMITHFIELD CLUB CATTLE SHOW.

Dear Sir,—The stimulus given to the agriculture of this country by the efforts of the various societies of the kingdom, and amongst them *especially* those of the Smithfield Club, is by no means alone displayed in improvements in the breeds of cattle, sheep, and pigs, wonderful as this has been the last few years. I may go further, and say, that in the invention and improvement of agricultural machinery, and in the application of new mechanical powers (if steam and railroads can be called mechanical) to the processes of agriculture, the progress made has not only kept pace with, but has far outstripped, during the last ten or fifteen years, *that* made in the breeding and fattening of animals for the slaughterhouse. In some respects, I cannot see any great improvement upon the efforts of Bakewell and the Collins', who by dint of that discernment, united to a confidence in their own judgment, which few amongst us are fortunate enough to possess, arrived at perfection, or nearly so, by what may be truly called "a royal road," and produced cattle and sheep quite equal, in point of symmetry, compactness, quality of flesh, and smallness of bone, to those of the present day. The chief improvement I discover is in that wonderful precocity which distinguishes the several kinds and breeds of animals, and which, however advantageous to the grazier and breeder—and I may add, in some respects, to the public in general, by affording a larger supply of meat—it is still a question whether the *quality* of precocious beef or mutton is equal to that which has had a reasonable time to arrive at maturity. Certain it is that our neighbours the French are glorifying themselves on the superiority of their beef, to that which John Bull himself can now boast.[*] It is true, I don't give them *all* the credit they thus claim; for although I have never been across the channel to eat "*ros-bif*" in that country; as an old farmer and grazier I can form some judgment of what sort of "*bif*" it must be, that is furnished by a five-year-old bullock, who during at least three of those years has been employed in doing all the dirty work of the farm, to the hardening of his muscle and the impoverishment of the mucous-membrane and the juices of the body. This is not the question raised; but whether a bullock of four or five years old, who has lived a *gentleman's life*[†] *the whole time*, does not furnish better and more savoury meat than one of two years, at which age so many are now killed? The same reasoning applies to sheep as well as bullocks, and has much truth in it; but we must still consider the modern system of breeding and grazing a vast improvement. By it we raise a weight of meat in two years as great as was formerly done in four, so that the quantity brought to market is doubled, and the increasing demand met, without a *proportionate* increase in the number of animals.

In respect, however, to the advance made in agricultural machinery, there can be but one opinion—that it has been rapid and beneficial. The exhibition at Baker-street was calculated to strike a stranger with astonishment at the wonderfully inventive powers of man in the construction and perfection of the steam-engine and its application to the various operations of the farm. The "reaper," too, with Burgess and Key's addition of the Archimedean screw, which so greatly facilitates the binding of the sheaves, is an extraordinary effort of genius; and Boydell's steam-plough and traction-engine is the crowning application of the monter-power;[*] and whatever room there may be for improvement in its construction, the principle of steam-ploughing is beyond a doubt established, and its adoption on large farms at no distant day is certain. These two machines, the American reaper and the steam-plough, may be considered the most important additions to the furniture of a farm, as facilitating and shortening the time of labour at those periods when time is of so much value to the farmer. The plough will also liberate the horses of the farm, to be employed upon other work, without interfering with the tillage.

In passing through the machinery department of the Show, a person who, like myself, can look back to the state of the farmer's stock of implements at the commencement of the present century, cannot but compare the lightness of the labour of the farm now with the onerous toil of that period. It is not saying too much, I think, to assert that one-third more work can be done now with the same number of hands, and that the land therefore receives one-third more tillage than formerly, in the course of the year. This will undoubtedly increase the produce, as well as place the labourer in a better condition by superseding the heavier work performed heretofore by hand. If this extended only to the two departments of the flail and the sickle, it would have conferred a large boon upon the labourer; for I can testify, from experience, that nothing tried the strength of a man more than the barn-labour and reaping; although the latter, from its short duration, and the good living incident to harvest time, was less permanently wasteful of the labourer's strength than thrashing.

But the lightening of labour is not confined to these two departments. Every *old* implement used upon the farm has been so improved as to render the use of it less laborious; whilst innumerable *new* ones have been invented, all tending to the same result of economizing the strength of the operator, or of superseding it altogether by the application of machinery. I might refer to the chaff-cutters, the corn-dressers and screeners, the root-cutters and raspers, the haymaking-machines, with numerous others, by which the work of the farm is performed with so much less of manual labour, and in less time than formerly. The effect of this will be sensibly felt in a few years; not only in the greater produce of the land, but in extending the average period of the labourer's efficiency, and rendering his old age less painful and burthensome to himself, and to society less useless.

It is very evident that the implement department is becoming too large for the place of exhibition. As to taking a systematic and critical survey, or even a cursory examination of the various machines exhibited, there was not room for it, even if the place had been clear of visitors. But, with such a crowd as attended on the two days I was there, it was impossible to examine any one machine so as to form any competent judgment of its efficiency; and I gave up the task in perfect despair, and could only walk through the rooms and admire the perfection of the workmanship of the several machines, and *guess* at their adaptation to the work for which they are designed. This is the only fault attached to the Show, but it is a great and *growing* one; for every year adds to the number of the specimens exhibited, whilst the bulkiness of many of them requires a much larger space to display their capabilities.

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[*] See the "Journal d'Agriculture Pratique," of Nov. 5, 1857.

[†] A negro in the West Indies was asked to define the word "gentleman." "I s'pose," said he, "dat de pig is de ony gentleman." "How so, Sambo?" "Why, you see, massa work, missie work, oberseer work, horse work, nigger work; all work but de pig—derefore de pig is de only gentleman."

[*] It is a singular coincidence that a friend of mine, connected with the Board of Public Works, in Dublin, suggested, *six years ago*, to an engineer, the very plan that Boydell has carried into effect. The engineer doubted whether the shoes would not fly off when the machine was in motion, and my friend thought no more of the matter. This, however, does not affect Boydell's claim to originality, as he knew nothing of the affair.

Whether the present site of the Exhibition is the best adapted to the purpose that can be obtained, is a question I do not feel competent to decide; but there is a plot of ground in the centre of the metropolis which might be devoted to that purpose, if it is attainable. I refer to Old Smithfield, where an ample building might be erected suitable to the Show, and applicable to other uses during the rest of the year. I understand that a portion of the ground is to be appropriated to a dead meat market, but there would still be abundance of room for a *Smithfield Club "Crystal Palace."* Such a building would reflect honour upon the Club, and I think might be managed so as to yield an ample return for the capital expended.

Yours truly,
AN OLD NORFOLK FARMER.

London, Dec. 15, 1857.

FEEDING OF CATTLE.

I felt happy in seeing the question mooted in your paper of the 9th instant, "What shall we do with our sprouted wheat?" It is one which I am very certain has been too much neglected since the disastrous harvest of 1856, when so much of that valuable cereal was rendered unfit for the usual appliance to human food. Having used grains, especially oats and barley, for several years in the finishing-off my fattening cattle, generally using this artificial food three months before selling, and always found its use profitable; even when cattle were as low as 8s. a Dutch stone, I considered it a profit to use these grains, when oats were under 20s., and barley 24s. per quarter, for the respective standard weights of 40 lbs. and 53 lbs. per bushel. I have often remonstrated with my agricultural friends on the folly of using oilcake at £11 and £12 per ton, when grain was at these rates, especially when in most seasons from late districts they can both be purchased at light weights, say 36 lbs. and 48 lbs., thus reducing the price. While I draw attention to these inferior qualities, I may state that I never found it a loss to use the very best quality of both, as when good I got it cut with mill stones, without drying, and thus lost no weight. Having a corn mill of my own, I doubtless possess a facility for stuffs to mix the cut grains with, which others, differently situated, may not so easily obtain; but this is very secondary, as I conceive cut straw, chaff, and husks of oats got from a corn mill quite suitable: better than either, bran would suit the practice admirably. My own practice has been to give either meal seeds, which sell at 5d. a stone, or corn dust, which can be had at 4d. a stone. The meal seeds, being sweeter, is taken with more avidity; but when once cattle commence with them, I find no difficulty in getting them to take dust when given instead. Just now, my milch cows are all getting cut wheat, with dust, while the fattening cattle are upon the seeds. The immense importance of such a feed over oilcake is, that you save so many turnips. When feeding off cattle in the early spring months, I have given as few as one-fourth the quantity of turnips an ox would eat, when not supplemented; in such a case, giving water once a day. I may briefly state my own mode of treating the cattle. When they are put up in October they get for two weeks turnips alone, fed thrice a day; after such time I give one feed of cut grain, either oats, barley, wheat, or rye. I have frequently used Irish meal, when it could be bought not over 30s. a load. The quantity of cut grain allowed at first, 3 lbs. a feed, mixed with nearly a stable pailful of meal-seeds or corn-dust. The cost of such feed at present, taking wheat, rye, or barley at 30s., will not exceed 4½d., and, I may mention that cattle thus fed will do as much in three weeks as in a month if on turnips alone. I always give it dry; at first it was made into brose, but I find the cattle take it more readily dry, and it seems to do equally well, if not better, with them: let it be understood, this food serves wholly for the usual supply of turnips at this time of feeding. When scarce of turnips I give the grain feed twice, and turnips once, thus saving two-thirds turnips; and if having sufficient straw for littering and eating, I can feed three cattle for one; and I am very certain that when I raise the grain-feed to 3½ lbs., and give twice a day, and once turnips, I can fatten twice as fast as on turnips alone. My stalls for the food are flag stones, so no trough is required to give the food in; the cattle-man just sweeps it clean with a wisp of straw, and when thus occupied, never have you seen horses more restive for their oats when hearing the corn-chest opened, than the cattle for this their dainty food. I have all my milch cows just now in a flow of milk on the same rations. In their case I give the corn-dust instead of the meal-seeds; it is cheaper and more plentiful. I consider if a cow is giving 8 quarts, it is profitable to feed her thus, either once or twice on grain, as you may deem fit. You will secure 11 or 12 quarts instead, have the butter sweet and free of turnip taste, and, on a cold frosty morning, have the satisfaction in seeing your cows eating with comfort, instead of trembling over a mass of frosty turnips. When cows are becoming dry, or when the flow of milk gets below the said minimum quantity, it is the better way not to force, unless the cow be not in calf; in that case feed on as high as you please, for cows milk to the last and lay on very fine beef too. Your correspondent "S." refers to analyses of cereal grains in Professor Johnston's *Elements of Agricultural Chemistry.* I had my attention drawn to the very pages he notices from seeing the sprouted wheat selling at so low a price, as well as good rye; the rye is not priced by your correspondent, but it will be found to possess feeding properties in its analysis just about equal to wheat. Since seeing this, I have been using in the very same way rye and sprouted wheat in equal parts, in the exact mode as I have detailed. For two months my cattle feeding and milk cows have been thus treated, and my cattle-man says it is suiting better than the oats or barley, and the dairymaid has no complaints of a lessened supply of milk. Now, at the ruinously low rates of wheat (some of last year's crop I bought as low as 24s., it weighing only 53 lbs., and rye at present is only 22s. to 23s. per 53lbs. weight), I maintain it is madness to sell a bushel, and use turnips even at the moderate rate of 6s. a ton. In my experiments I have never taken into account the increased value of manure, which is very great when the byres are cleaned out from cattle so fed; the discharge of urine is found less by one-half, and the pungency of the atmosphere clearly proves the great increase of ammonia. Apart from this profit I am certain that if beef does not fall below 6d. a pound to the farmer, in selling his fat cattle, it is his profit to use oats, if not above 20s. per qr., at per bush. of 40 lbs., barley 26s. 53 lbs., wheat 36s. 62 lbs., rye 28s. 56 lbs., *rather than give full turnips* at 6s. per ton, and I question if many turnips this season are being consumed at so low a figure. Last season, when wheat was very wet, I had it kiln-dried before being cut; as unless so, it would have got musty, unless cut very frequently. I may mention a caution very much needed, however, in feeding with oats or oatmeal; the oats possess an alkaline character different from the other grains, and the cattle fed on them are very liable to get hoven, so much so, that I could never leave them for two hours after being fed with turnips, the first feed subsequent to the grain feed. When feeding with the oats, I had almost daily to use turpentine to suppress hoven, which is a decided objection to using them at least oftener than once a day, in order to have the stomach clear as possible of the oats; my system being, to give them the last feed in the afternoon, and then no turnips till next morning. This I proved obviated the danger very much; still not altogether. It affords me great pleasure, however, to state, *with confidence*, that there is not the slightest fear of this hoven from feeding with the wheat and rye, or either alone. There is a further recommendation of the wheat I may mention—the cattle seem to prefer it to anything else—I mean any other grains; and I feel quite satisfied your correspondent is right when adverting to the improved condition of the wheat for feeding by being sprouted. In conclusion, it must be patent to every one who has tried it that the saving in turnips by using oilcake at *a cost of 4d. to 5d. a feed* is trifling, while in issuing the grain it is immense. By using one feed of grain, you not only get the value of the nutriment it contains, but by retaining the turnips longer under the absorbent action of the intestines you extract more nutriment from them than when using them alone. I have never tried the grain for young cattle, but am satisfied it would suit well, and be preferable, because less expensive than the oilcake you often wisely recommend, instead of full allowance of turnips to young cattle. In conclusion, I will add my own experience on hoven. To any who may try oats or oatmeal, and be damaged by the swelling, give two or more glassfuls of turpentine, in a half-bottle of linseed oil, taking care to shake the whole well together. This, if given early, is quite a specific. This dose is sufficient for an animal of 50 imperial stones. This subject I have once and again, for two years past, desired, through your paper, to lay before my agricultural brethren; perhaps I had not yet given my experience but for the article of your correspondent "S." of the 9th instant. Whatever value may attach to my experience, in making damaged grain of more value to many who unfortunately possess it, I shall feel very thankful for that. I by no means restrict its use to damaged grain, but to any, the soundest of it, ranging within those limits I have specified, and beef worth 7s. per imperial stone. My remarks, I feel, have lengthened out on my hand far beyond anticipation. I only fear they are too lengthy for insertion.

WILLIAM JOHNSTON.

Mill of Kincardine, 10*th Dec.*, 1857.

P.S—From what I have said above, those conversant with fattening cattle will not need to be told that beef thus fed not only is esteemed highly by butchers, but they will actually, if they know, buy them higher, the internal fat being much more plenty.—*North British Agriculturist.*

SURVEYORS OF HIGHWAYS, AND THEIR RESPONSIBILITIES.

Our readers are probably well nigh tired of what is called the "Broughton Astley Surveyor's Case," a further development of which is recorded in our columns this week; but we must ask them to bear with us yet again for a little while. The questions involved in the case are of the highest importance; and as the subject will have next session to be discussed in parliament, the case before us in all probability serving for a text, we are desirous that the public should be fully informed upon its merits.

By the Act 5 and 6 Wm. IV., cap. 50, the inhabitants of all rural parishes are obliged to elect from among themselves every year, a person to fill the office of surveyor of highways. The qualification for the office is the possession of freehold property to the amount of £10, a personal estate of £100, or the occupation of premises worth £20 per year. Every person not excused by law from serving the office of overseer of the poor, is liable to be elected parish surveyor. Being elected, if he refuse to act, he incurs a penalty of £20. The person elected will generally be more or less incompetent for the office, because the making and repairing of roads is no more to be understood without previous study and experience than any other business; but it is devolved indiscriminately on the village blacksmith, the carpenter, some one of the half-dozen farmers in the parish, or mine host of the Black Lion, all and sundry of whom are by the law deemed equally capable. The newly-elected surveyor has his own ideas of road reform, and at once proceeds to carry them into effect. Here, however, he incurs a serious responsibility. The same act of parliament which obliges him to accept an office for which he is utterly unqualified, says that if he neglect his duties, or fail to fulfil them properly, he shall be liable to a fine of £5. If, in his anxiety to avoid the consequences of neglect, he should overstep the just medium, and, instead of doing too little, do a little too much, then any ratepayer who may happen to think his rate a penny in the pound too high, or who may have a personal enmity to the surveyor, may object to his accounts when they are brought, as they must be, to be verified by the magistrates. These, in the exercise of their discretion, may think too much has been done, or that what has been done has been paid for too dearly, and they can at once disallow such items as they consider objectionable; the effect of which disallowance is, that the man who unwillingly took an office for the good of the public, for which he felt himself incompetent, and then tried to do his best in it, is exactly the sum of those items out of pocket, and from such decision, upon whatever insufficient grounds it may be arrived at, however (in some cases it may be dictated by personal ill-will), there lies no appeal to any court in the universe.

Such being the state of the law in March, 1856, Mr. Thomas Pougher Greenway was elected under its provisions to fill the office of surveyor of highways for the parish of Broughton Astley. He seems to have been an energetic gentleman, and to have commenced a vigorous effort for the improvement of the roads which had been placed under his charge. Work cannot be done for nothing; and it naturally followed that a pretty heavy bill was incurred. Mr. Greenway's year of office terminated last March, and either himself or his friends were anxious he should be re-elected; but, whether from a feeling that he had led the parish into too large an expenditure, or from some other cause, he was opposed, and, as the result of the poll, another gentleman named Johnson was elected, by a majority of 36. On the 9th of April Mr. Greenway attended before the Lutterworth bench, represented on that occasion by the Rev. J. P. Marriott and D. R. Jones, Esq., to verify his accounts. They were objected to, and the further consideration of the subject was adjourned till the 20th. On that day the case was gone into: a number of witnesses were examined to prove that the work done under Mr. Greenway's directions was unnecessary, or badly executed; evidence to the contrary was also called, and the consideration of the case again adjourned till the 1st of May, in order that in the mean time the magistrates might see the work and judge for themselves. Accordingly, on the 28th, they went over to Broughton Astley, and spent two hours in inspecting the work. On the 1st of May the question was again gone into at Lutterworth, when evidence was given at great length in favour of Mr. Greenway. The magistrates again adjourned the case without coming to a decision. On the 14th they gave judgment, announcing that they had come to the determination of disallowing certain items in Mr. Greenway's accounts, to the aggregate amount of £80 15s. 2d.

The accounts were then passed, with the following differences in the items of expenditure:—

Description.	Amount of accounts as originally presented.	Amounts allowed.
Manual labour	£106 5 11	£78 4 11
Materials............	85 7 0	77 19 7
Tradesmen's bills	75 6 0	39 4 4
Team labour	52 7 11½	48 7 11½
Other payments......	23 5 6	18 0 6
		£261 17 2½
Amount disallowed..........		80 15 2
	£342 12 4½	£342 12 4½

Mr. Greenway was naturally taken somewhat aback, and declined to hand over the money. An appeal was made to the Quarter Sessions held in Leicester, in July, upon which the chairman decided that the court had no jurisdiction. The case was subsequently brought before Mr. Justice Wightman, at chambers, but only one result was possible, and as the conclusion of the whole matter, Mr. Greenway has just paid the sum of £112 11s.: what his own legal expenses may be of course we have no means of knowing.

Having thus given a brief resumè of the case, we have no intention to dispute the decision of the magistrates. They had a difficult duty to perform, and no doubt decided to the best of their skill and judgment; but we would ask, Does not a law which permits such a state of things to arise, manifestly need a revision? We regretted the sudden abandonment of the bill brought in last session, by Mr. Under-Secretary Massey, because we conceived its provisions to be in the main admirably fitted to accomplish their object. It will be remembered that this measure proposed the consolidation of parishes, and the appointment of a district board, partly elective and partly *ex officio*, to be responsible for the highways of the district, over which they were to appoint a professional surveyor. The principal exceptions taken to Mr. Massey's bill related to the *ex officio* members, who in some cases would have been all, or nearly all, clergymen, and who would have completely out-voted the elective members. In the new measure promised next session, we trust provision will be made to secure to the latter at least an equality of votes on the district boards; and it is a serious question for consideration whether the clerical element should be introduced at all, except perhaps in the case of clerical magistrates.—*Leicester Journal.*

THE CRYSTAL PALACE WINTER POULTRY SHOW.

The Crystal Palace at Sydenham has been ever famous for its musical attractions. Mr. Mann's excellent band still daily perform the gems of the best composers of all nations. The recollections of the great Handel Festival are still fresh in the memory of those who attended it; and there are yet to be seen, in the central transept, the great amphitheatre and the gigantic organ used on that memorable occasion. But we doubt whether, in the musical annals of the Palace, great and glorious as they are, there is to be found an occasion when so many instruments were heard at the same time, and kept so long and continuous a roar, as can now from dawn till dusk be heard in that huge greenhouse. To make the concert perfect, there are only two things wanted: Mr. Mann is not present, with his *bâton*, to lead the noisy orchestra, and the performers have evidently forgotten to tune their whistles. But every note—natural, flat, and sharp—is there to be heard, from the deep ophicleides and double bass of the Cochins and Bramah Pootras to the shrill piccolos of the bantams—from the trumpets of the ducks and geese to the bassoon modulations of the turkeys and the hautboys of the pigeons—every sound is intoned, keeping a perpetual roar, that dins in one's ears for many hours after leaving the scene of this noisy festival.

To lovers of poultry, and even to the uninitiated public, who merely admire size, form, and plumage, the present exhibition offers a rare treat, for it is as complete as it is varied and large; and as to excellence and perfection, we have heard several exhibitors, boasting of great experience in these matters, declare that it has never been excelled, if ever equalled.

To give an idea of the immense number of fowls now congregated in the long and spacious gallery situated at the south extremity of the Palace, we subjoin an abstract of the various classes, and the number of birds exhibited in each.

Classes 1st, 2nd, and 3rd compose the Spanish, of which there are 90 old birds, 147 young ones hatched in 1857, and 17 single cocks; altogether 254 birds.

This valuable breed is very well represented; but, notwithstanding their excellence, when compared with English game and Dorking breeds, they sink into comparative inferiority, yielding the palm of elegance to the one, and of size, compactness, and weight to the other.

The 4th, 5th, 6th, 7th, and 8th classes comprise the Dorkings, which have never yet justified to so full an extent the well-deserved popularity they enjoy. For well-proportioned bulk, weight, delicacy of plumage, and well-harmonized outlines of shape, this admirable breed is second to none in the world; and their extraordinary muster at the Crystal Palace exhibition clearly shows the advantages resulting from their being bred at our farmsteads and around our cottages. It may be proclaimed as the English breed of poultry *par excellence*. It is substantial and delicate, attaining early maturity, and pronounced by all gourmets as the most savoury bird on the table. What else can be wanted to give them the pre-eminence over all other breeds?

Of these there were no less than 153 old birds, 303 chickens of 1857, and 46 single cocks; in all 502 birds! In these classes, four cocks exhibited by Mr. Fisher Hobbs, so celebrated for his breed of Dorkings, were greatly admired; and one of them obtained the second prize.

We next come to our old friends the Cochin Chinas, of bygone celebrity. They are comprised in the 9th, 10th, 11th, 12th, 14th, and 15th classes, and number of old birds, both buff and white, 75; of chickens hatched in 1857, 159; single cocks, 31: altogether 265.

All we can say of this class is that if such birds as the majority of those which are exhibited at the Crystal Palace had existed at the time of the Cochin mania, great as were the prices then demanded and readily paid, they would have been still greater and better justified. In size, purity of plumage, less awkwardness of shape and gait, and smaller size of bones, they have been greatly improved; but notwithstanding the evident progress they have made, they must nevertheless yield the palm in every respect to their first-cousins and neighbours, the Bramah Pootras, which comprise the 16th, 17th, and 18th classes, numbering 36 old birds, 63 chickens—such chickens!—hatched in 1857—and 13 single cocks; in all 112 birds.

Over the rows of pens, containing the bass instruments of the noisy concert, stand in all the pride of their gait, the brilliancy of their plumage, the flash of their brilliant eye, the eagle shape of their fine head, the elastic and firm stamp of their steel legs, the elegance of their shape—the ever-loved and petted old English game breeds. And right beautiful is that proud and defying array of their pugnacious majesties! They are comprised in Classes 19 to 27, and number of old birds 192, chickens hatched in 1857, 309; single cocks, 34; altogether 535 birds!

What shall we say of the other breeds? Indeed, were we to attempt to do justice to all, the short space at our disposal would not half suffice. We are then very reluctantly obliged to dismiss the smaller fry of Gold and Silver-pencilled, and Spangled Hamburghs, so varied and so beautiful in their gay plumage, with the mere mention of their brilliant names—names suggested by the richness of the embroidery with which they are so gaily decked. We must reluctantly do the same with the fussy and busy-looking tufted Polish fowls, shaking their shaggy helmets as if intent upon the most important business. Our duty would evidently be to merely give a nod of recognition to the tiny Bantam; but we cannot resist the temptation of tarrying a little longer before their pleasant and really charming array. Here you can see the gold and silver-laced, the white and the black, all gay and crowing, turning and twisting in their little pens, as if they took pleasure in showing to the admiring crowd the elegance of their tiny forms and the delicate lacing of their gay feathers.

The ducks, geese, and turkeys are truly astonishing by their great weight: we have heard of ducks of twelve pounds each; and of a turkey weighing thirty-five pounds. A pair of geese exhibited by Mr. Baker, of Chelsea, were certainly the largest and handsomest birds we have ever seen.

We were pleased to observe a few pens of *Crève-cœur* fowls, the well-known Norman breed from the other side of the channel. This truly valuable variety well deserves the attention of poultry-fanciers in England; for weight, early maturity, and the delicacy of their flesh they deserve to be compared with the Dorkings, whilst for the production of eggs they are infinitely superior.

There is one point in this, and other exhibitions of the kind, which has always struck us as tending to divest them of that degree of practical utility with which we should like to see them attended—that is, the absurdly extravagant prices affixed to the various pens of birds. It is very true that a man fixing the price of one thousand guineas for a cock and two hens, merely means he wont sell them; but we apprehend that more modest figures, such as range between five to fifty guineas, are really meant as the selling value of the birds. On this we can only observe, that if poultry breeding, improving, and fancying can only lead to such an unpractical result as this, these exhibitions become deprived of their public utility, and sink at once into the insignificance of hobby displays—solely devoted to whiling away the time of idle men, and gratifying the monomaniac tendencies of inoffensive but useless members of society, having more leisure on their hands than they have the mental power to fill up. The absurd regulation of poultry societies compelling exhibitors to fix a selling price upon their pens, at which they may be claimed, is no doubt the cause of this extravagance. As long as this regulation exists, it may be safely asserted that serious and practical men will keep aloof from such exhibitions, leaving the pursuits they encourage to sinecurist clergymen, retired tradesmen, shelved officers, old ladies, and to those who speculate upon the weaknesses of the rich and idle.

THE GOVERNMENT ON THE AGRICULTURAL STATISTICS OF SCOTLAND.

It must be admitted that the question of taking agricultural statistics has never travelled quite pleasantly in England. Despite the resolutions of public meetings and the testimony of individual evidence in favour of the experiment, there has ever been an under-current of distrust and opposition. So far, indeed, the Government have had but little to stand on. The practicability of the scheme is still problematical, and Mr. Caird is even now employed in devising some new measure that shall "go down" a little more easily. Nevertheless, there was always one trump-card ready to be played. The statistics of agriculture *might* be collected, simply because they *were* collected. If prejudice, indifference, or ignorance of their effect stayed us here from furnishing such returns, there was fortunately no such inimical influence to encounter but a few hours further on. It was surely a great fact for the Government to handle—a rare weapon to use when wanted—that the statistics of Scotland had been collected by the farmers themselves, under the immediate superintendence of a farming society—That such information was obtained not for a trial of one year only, but that the machinery had gradually been improved upon and extended, so as to become almost perfect in its action, and unquestionably most satisfactory in its results. With such a story to tell us, we might have been kept perpetually in check. The farmers of Scotland have now for some years sent in their returns. So far from feeling any injury from this practice, they appear more and more to take a pleasure in completing the form of such intelligence. They do their work at little or no cost to the State.—And, in short, the whole business is a very happy example of what may be done with a good will and a proper understanding.

But this proper understanding exists no longer. This good will is destroyed. The agricultural statistics of Scotland—or of England, have received something very like their deathblow. Indeed, at this moment we should say such a plan has far more enemies over the Border than it ever had to encounter nearer home. And this suicidal act has been administered by the Government itself. It is traceable simply and directly to a blind adhesion to routine and red-tape. Ben Jonson has told us who works "with line and rule" and by line and rule, and by never looking an inch beyond the line ruled, have we contrived to make foes in place of friends of the great body of Scotch agriculturists.

The murder came out at a General Meeting of the Highland and Agricultural Society, held in Edinburgh a few days since. Let our readers learn from Mr. Hall Maxwell the chief points in this extraordinary affair:—"The statistical inquiry was commenced in 1853 by an experimental trial in three counties. The estimated cost was 900; the outlay was £672. In 1854 it was extended to the whole of Scotland. The estimated cost was £6,000; the outlay was £4,260. In 1855 and 1856 the estimate was £4,000; the outlay, £3,597 12s. 10d., and £3,592 8s. I was permitted by Government to make, in concert with the district enumerators, all arrangements, financial and otherwise, without interference. My accounts were rendered to the Board of Trade; and in 1853 and 1854 I received the thanks of that department for the economy observed and the reductions effected. In August 1855 Mr. Bowring, of the Board of Trade, acknowledged the accounts for 1854 in the following terms:—"I am to acquaint you, for the information of the directors of the Society, that my Lords have been pleased to approve of the accounts in question."

So far certainly so good. The experiment had not only succeeded, as achieving the object aimed at, but had been worked at considerably under the estimated expense; "My Lords" being, naturally enough, "pleased to approve of the accounts." But here, however, our old enemy, Routine, steps in, just, of course, at her dear, old-fashioned, tortoise pace, and demands, under the authority of the Audit Office, in March, 1856, the vouchers for the expenditure of 1854—two years after "my Lords had been pleased to approve of the accounts in question"—and vouchers, too, for everything

—not merely for the most trifling expenses, such as extra pens and cleaning out-offices, but vouchers for *authority* for employing enumerators and clerks. That is to say, Mr. Hall Maxwell, to whom the management of the Scotch Statistics was unreservedly entrusted by the Government, is to give the authority upon which he made an appointment! To detail why he engaged this clerk, or how it was he induced this or that friend to act with him. Then, these friends or acquaintance—the gentry and leading agriculturists of the country, who so ably supported their Secretary in his endeavour to do the thing properly—had, it appears, some slight allowance for necessary expenses, money absolutely out of pocket. But they had more than this. Once or so in a season they assembled their coadjutors of the several districts over a dinner, when they made their arrangements, received advices, and got through similar business it would have been difficult to transact by any other means. Mr. Maxwell paid for these dinners out of the Government grant, and sent in his vouchers that he had done so. But he is to do a great deal more than this. His word is nothing. The Audit-office insists on having the vouchers of the several enumerators that their expenses and dinners have been paid for—something of this kind no doubt:

> "Received this day, with many thanks, of her Majesty's Ministers, the sum of six shillings and tenpence-halfpenny, in payment of dinner and toddy, supplied to me by the landlord of the Caledonian Hotel, as one of the Agricultural Enumerators.
>
> (*Signed*) "STUART, of Stuart.
>
> "Witness, Sawney McSanday, the waiter."

But one sickens of such absurdities. Mr. Maxwell with admirable temper completed the returns of last year, and then, of course, withdrew in disgust from any further association with such powers as he found he had to deal with. It is not too much to say that the whole of Scotland goes with him. The enumerators, as a body, have passed resolutions approving of what he has done. He acts directly under the sanction of the Highland Society, and on the close of the explanation he offered, was specially complimented by the Duke of Buccleuch, Lord Rosslyn, Lord Kinnaird, Sir John Forbes, and other speakers. There is no question but that under his superintendence these statistics have been taken in the most perfect manner possible. It is scarcely too much to say, that no other man could have done the business so well. He undertook and performed a Government contract most successfully, and with only one mistake. He did not avail himself to the full of a contractor's rights. He did not spend all the money he might have done. Instead of returning a thousand or two annually, what would have been easier than to have accounted for—as they want accounts—the maximum allowed him? It is a standing joke in many such a business as this, that "no money is returned." A smart sharp fellow would have run it out to the very halfpenny. The Government did not appreciate the man they had to work with; but, unless we are much mistaken, they very soon will.

An attempt has been made to consider Mr. Maxwell merely as a paid clerk or government official. That is, he received for each year's services an acknowledgment of some two or at most three hundred pounds. To do the same work as it has been done, or half as well, will necessitate "an appointment" of at least from fifteen hundred to two thousand a-year. But we question very much whether we shall have any more Agricultural Statistics from Scotland. Indeed, this is not, after all, the great thing with the Government. The statistics they want is the absolute price of a leg-of-mutton dinner, and what is spent in more pens, wafers, and red tape.

If ever there was a fatal mistake, it is the treatment of the Highland Society by "My Lords" of the Treasury. They have put back Agricultural Statistics to a status something far worse than what it was when the Scotch Society took them up, and have contrived for themselves some very up-hill work to do over again.

THE ADVANTAGES OF A DAILY REGISTER OF THE RAIN-FALL THROUGHOUT THE UNITED KINGDOM, AND THE BEST MEANS OF OBTAINING IT.

The Society of Arts appears to be more and more ambitious to rank as an agricultural authority. It is no longer content with one paper or so on the subject, in the course of a season. On the contrary, these now crowd in upon us in very rapid succession. The new year's list, running up to the beginning of April only, has already three evenings to be devoted more or less directly to the improvement of the soil. Unfortunately, however, there is little promise of the most being made of these occasions. Of course the first object should be to ensure the attendance of as many men practically interested in the question, as it is possible to assemble together. Their convenience should be especially consulted; as their presence must tend materially to put a stamp and value on the proceedings. Within the last year or two a very fair sprinkling of agriculturists have joined the Society, while still more have accepted the occasional invitations offered them. Now it is well known the majority of these come up the first week in every month. There is the discussion at the Farmers' Club on the first Monday in the month, and the council meeting of the Royal Agricultural Society on the first Wednesday morning. The meetings of the Society of Arts are on the Wednesday evenings, and yet not one of these rural topics is put down for such times as the country gentlemen may be amongst us. Mr. Algernon Clarke is to speak to "Steam-cultivation" on Wednesday, February the tenth, instead of the third—just, in fact, a week too late for his audience. Monsieur Trehonnais is to compare "French Agriculture past and present" on March the seventeenth, whereas the opening of the following month should clearly have been selected. Even in these railway days farmers cannot afford to be perpetually running up to London: and we know they now so plan their arrangements as to kill all sorts of birds with one stone. Ask Mr. Hudson how many visitors he has at other times; or inspect the Club-rooms later on, and we shall find that our friends have got into a habit of accustoming themselves to this first week.

Do not let it be supposed that we speak without some showing. On only Wednesday last, Mr. Bailey Denton, a gentleman well known amongst agriculturists, read a paper at the Society's house in the Adelphi, bearing on a subject at present of particular importance to the farmer—that of drainage. In a not over-numerous audience which assembled to greet him, we noticed one practical agriculturist, Mr. Fisher Hobbs.

We will not say that either Mr. Clarke or M. Trehonnais will meet with a similar reception; but we have little doubt but that the character of the company will, or would have been, very different had Mr. Denton taken the first Wednesday in February, Mr. Clarke the first in March, and M. Trehonnais the first in April. There is a wonderful want of method in all this.

Mr. Bailey Denton discoursed again on his pet theme, and he argued on it as every sensible man now does. We are the victims no longer to dogmatic assertion or despotic sway. The Professor, who harps but on one note, or, Paganini-like, plays on a single string, charms us no longer. The rule of three, or of four feet has lost its force. It is no further to be regarded as without an exception. On the other hand, we study the particular nature of the soil, we consider its situation as liable to atmospheric influence, and sum up a variety of similar causes, ere we venture the application of our remedy. Mr. Denton's paper had this direct tendency. He spoke "on the advantages of a Daily Register of the Rain-fall throughout the United Kingdom, and the best means of obtaining it"; and every word he said only went to show how our practice must vary according to the difference of soil, climate, and locality. The unintentional moral, moreover, which he conveyed to his hearers was, that every-one must think and act more or less for himself. Indeed, to be of any peculiar value, each one of us should keep his own rain register, as many even now do. If Mr. Denton's address lead to any useful result, it must be to this. At the same time we are bound to say that his paper of Wednesday is by far the least practical of all his effusions. It clearly put too much dependence on the rain test—as manifestly under-rated what had already been done in this way—and advocated a system for doing something better, that not one of his auditory had the slightest opinion of ever seeing carried out. Mr. Denton would map the kingdom out into ten, or even five-mile stations at a cost to Government of twenty-six thousand, or on the other scale of about half as much, per annum. The chairman of the evening, Mr. Sopwith, "thought such a plan was not required." Mr. Rawlinson said "a national system of rain-gaugings must be very costly, and the results would only be useful to a limited extent. No nation could do the work of individuals, nor ever would do such work." Mr. Thomas Webster, F.R.S., "did not regard it of so much importance to know precisely the quantity of rain that fell at each place; and the observations already made were very numerous, and might, he thought, be considered sufficient." And Mr. Greaves "thought Mr. Denton had over-rated the requirements of the case, inasmuch as at the present time a very large number of records of rainfall were kept."

There is, in short, no doubt but that Mr. Denton's enthusiasm has carried him too far, and long beyond the limit of any probable effect to be arrived at by such a means. Still, in justice to him we may quote a few sentences from his paper, on the actual necessity for such a monitor as that he advocates the use of:—"I am bound to record my own conviction, based on an extensive practice in the drainage of land, that there is no information more essential to successful treatment than that which it is the object of this paper to promote, and that it is the ignorance now prevailing with regard to the influence of the rainfall, added to the common belief that drainage is a mechanical operation which an uneducated bailiff or woodman may carry out, that has led to the discredit attached to the drainage executed under Government auspices, and has fostered the opposition of certain members of the Central Farmers' Club. As a proof of how little attention landowners have hitherto paid to rainfall, I may mention that when I undertook to read a paper, three years back, before the Central Farmers' Club, on the results of under-draining in Great Britain, I addressed more than 300 persons in various parts of Great Britain, who had executed works of under-draining, and asked the following question among several others: 'What is the rainfall in the locality of your works?' I was gratified by receiving 162 answers to my letters, but out of 162 answers there were only six who were able to give me any information as to the rainfall."

As a king, who can do no wrong, does Mr. Denton disparage the opposition of the Central Club. However, let us pass on to more positive proof:—"In the west of England, where the annual fall of rain is 50 inches, some drainage was effected by a parallel system 40 feet apart. It was pronounced a failure. It has been compared with other works of drainage which were satisfactory in result, upon the same geological formation (with soils closely similar in character), drained in the same way, on the east side of Scotland. The rainfall there was 25 inches, and the number of wet days considerably less than in the West of England, and it is more than probable that these differences account for the results. Another instance will render the proposition even more clear. The lias clay, as already stated, runs nearly the whole length of England. It starts from Lyme Regis, where the fall of rain is 37 inches, passes by Grantham, where the fall is 24 inches, and runs out at the north-east corner of Yorkshire, where the fall is 21 inches. Lands of this clay (as similar as soils can be) have been drained in the several localities in a precisely similar manner, with different degrees of effect. The difference in the rainfall can alone explain the difference of effect. Sixteen inches of rain, which is the difference between the two extremes, is equal to 362,000 gallons falling upon every acre of land, and this excess is nearly equal to the whole annual amount of rain falling on the surface of Essex and Suffolk, in which counties many thousands of acres of clay lands, no stronger than the lias, are now being drained at a cost of from £5 to £6 per acre. This is a striking fact; but it will be rendered still more striking by reference to the Registrar-General's Return for the first three months of the year just closed. There it will be seen that the rainfall, for that period, at the three places named, was respectively 9 inches (Little Bridy), 6 inches (Grantham), and 3 inches (Scarborough). Hence it follows that the drains in Dorset would be required to do three times the work of drains in Yorkshire with the same means of doing it."

But still we must remember this average rainfall is not everything. As M. Trehonnais suggested, "during a storm an immense quantity of water might fall, and that contingency must be kept in view in drainage, in order to allow the superabundance of water to run out of the land. In his own opinion the average of rainfall had not so much to do in the way of drainage as some people seemed to imagine, because drains must be laid in such a manner as to give an outlet for the immense body of water that might come suddenly upon the land." Mr. Rawlinson, again, maintained that "in all cases the engineer must guard, above ground, against maximums, and, as far as is possible, ascertain what these were likely to be, and then work on the safe side. In all cases the rain-gauge should be consulted for minutiæ and for details; but for maximums, such as land-floods, valley outfalls of streams and rivers must be gauged."

In fact, the argument was altogether overstrained. Although there were no farmers to meet what was advanced, fortunately a few scientific men took up the discussion. These served at once to correct the somewhat too sanguine notions of Mr. Denton, and give to the proceedings a more stable character. The meeting does not promise to leave any very lasting impression.

THE PRESENT STATE OF VETERINARY SCIENCE.

Difficult indeed is the choice of a profession. There is scarcely one but the ranks of which are already overcrowded. Youths qualify themselves as medical men, to become clerks or guards on railways; while gentlemen learned in the law are waiting at table in Melbourne, or horse-breaking in the Bush. Divines and soldiers find it alike difficult to get on; and too often end as they began—but as curates and subalterns. Even farming, as a business, requires more and more capital to be fairly engaged upon; and trade of almost every kind is beset with opposition. But a few years since, to be sure, the famous Fitz-Boodle gave to younger sons some further opportunities, which, however, appear to have been scarcely appreciated. We are still languishing for some eligible pursuit, wherewith to employ the rising generation. As a relief—a sort of tributary stream to those already overcrowded with traffic and commerce—is there none we can embark upon? Is there nothing beyond Law, Physic, and Divinity? Or is there no opening to us but what emigration offers, or the fortune of war provides? If a lad is yet anxious to work his way in his own country, is there really no other call for his services, or no pursuit that might be turned to a better account than it now is?

Let us see. Our canny friends over the Border would at least appear to think so. Very recently there has been established, in Edinburgh, a new Veterinary School, at the opening of which a well-known professor, Mr. John Gamgee, delivered the inaugural address. It is altogether above the level of such orations; and is especially remarkable for the bold and unbiassed view Mr. Gamgee takes of his own profession, and the progress it has made. We are generally prone to consider this as very satisfactory. The difference between the intelligent educated veterinarian and the village farrier, with his infallible drinks and messes, was at once apparent. Perhaps "the college man" has not always taken that position he might have done; but still every one felt he was a change for the better, and we saw him prescribe for a sick horse or prize ox with far more confidence than we could have done had a grimy Vulcan or half-drunken cow-leech yet been concocting his curious spells before us. Nevertheless it would seem that the art is by no means equal to what is demanded of it. "Hundreds of thousands of pounds," says Mr. Gamgee, "are annually lost on British soil, which might be saved if the veterinarian could be found wherever he may be in requisition, and if at the same time *suitable training* had rendered him a useful man." Our lecturer strengthens this opinion with a ready application of what recently has occurred and is still occurring amongst us. Speaking as to the investigation of morbid phenomena in animals, he says:—

> "The last few years fully prove, even with reference to the epizootic diseases of Great Britain, how imperfect is our knowledge respecting them, and how insufficient have been the inquiries. It is impossible that a person, aware of what should be the qualifications of a veterinarian, can unblushingly read the reports which have spread from various parts of the United Kingdom respecting murrain amongst cattle. Those who read the daily newspapers might often be led to ask, Have we no veterinarians in Great Britain? It is said that a dozen animals have died altogether on one farm, and that in some districts the best part of a hundred valuable oxen has been swept off, in a manner as quick as it has been mysterious, and there is no one at hand to furnish the world with anything like a correct account of the real facts of the case. A plague is spreading from the Russian steppes; it is supposed to have made a leap close to the west coast of Ireland, or in the north of Scotland: we know nothing about the cause of death there; but we must go to Hungary, to learn what might be learnt at home from books written almost centuries ago, though certainly in a foreign tongue."

This is undoubtedly very hard hitting; but if it is true, we must all have been something more than apathetic. Mr. Gamgee himself characterises the evil as chiefly attributable to a want of hands. He, in fact, opens a new profession to us. The veterinary art has not for some years had anything like justice done to it. It is not properly nor sufficiently studied, in the first place; while in the next, there is a sad scarcity of practitioners, even qualified as they now are. In England we had certainly thought a veterinarian was by this pretty generally within hail. In Scotland, however, with nearly 8,000,000 animals, "we could count little more than 120 veterinarians. Am I to understand that Scotland can only support one veterinary surgeon in every 230 square miles of surface? As might have been expected, there is a greater or less congregation of these 120 practitioners in the larger towns; so that many considerable districts, and even entire counties, are unprovided with practitioners of the veterinary art, obviously to the serious detriment of the public interest. But, even where they are congregated, their insufficiency is too manifest; and the farmers in the three Lothians can give startling testimony, if asked what kind of advice is to be obtained when their animals are sick, and how far they have, in the great majority of cases, to send for veterinarians. Ireland is still worse. Nevertheless, look at the value of her stock! Is it astonishing that unqualified practitioners and blacksmiths swarm and prosper as they do throughout the land?"

We must be understood as taking this up altogether as a farmer's question. There is none more important to him, and no other ill from which he is so continual, and as it would appear, so inevitable a sufferer. If this can be remedied—if we can be provided with a more efficient class of men—if the immense losses now sustained from diseases of stock can be alleviated, then Mr. Gamgee deserves the best thanks we can offer him. He certainly takes very high ground. He quotes numerous instances where the aid of the veterinary surgeon is now altogether dispensed with, so little good has come of it. He has himself gained more information from "some country blacksmiths" than from "many qualified members" of his own profession. At the same time he shows the immense advantage it would be, to have a better organized and more reliable staff. We must take one more extract, at least, suggestive of some good to the agriculturist:—

> "Our large herbivorous quadrupeds are peculiarly liable to diseases of the digestive organs. These are very easily prevented; but as animals are badly kept, the prevalence of those maladies is so great, that it is quite matter of surprise. As I have elsewhere said, throughout Scotland devastation by colic is devastation as by a plague. In Mid-Lothian, the loss by colic, inflamed stomach, and inflammation of the bowels, was at least 37½ per cent. of the animals that died of disease in 1851, about 28 per cent. in 1852, upwards of 40 per cent. in 1853, nearly the same in 1854 and 1855, and upwards of 45 per cent. in 1856. An influential farmer of East Lothian, at a meeting of the Highland and Agricultural Society, was alluding to the ravages produced by this disease,

and of the utility of calling veterinary surgeons to attend the suffering animals, or of following out the indications met with in the popular treatises on veterinary medicine in the English language. He believed animals died quicker when subjected to treatment; but he wished a prize to be offered for an essay on the disease. Before, and since then, I have heard many farmers express the same opinion; but it is likewise an undoubted fact that, under proper management, instead of about 40 per cent. of the animals that die of disease dying of colic, there should be a per-centage of *one* or *two*."

We confess we shall be rather curious to see what the members of Mr. Gamgee's own profession say to all this. Undoubtedly he puts their present rank and claims at a very low standard. It may yet remain to be proved how far he is warranted in this, or of what improvement the art is really susceptible. Had he stood quite alone here, we might have hesitated as to giving his opinions any further publicity. But many think with him; and one of the most celebrated of living veterinarians of the English school, Mr. James Turner, has said:—"Of late the veterinary profession has been seized with apathy; no weighty facts, to last out all time, have been chronicled. The remedy and grand requirement of the present crisis is fresh infusion of energetic *spirit* for research."

THE WOOL TRADE OF THE PAST YEAR.

The publication of the annual wool circulars necessarily directs attention to the course of trade in that raw material during the past year, and the future prospects for the wool staplers and manufacturers, as regards this important animal product. Large as the extension of sheep farming has become, and extensively as pastoral occupations are now carried on in old and new districts, they are far from commensurate to the wants of Commerce. Side by side with the exploration and occupation of the squatter and sheep farmer, comes the rolling tide of population, as Emigration proceeds to new fields, and the demand for food becomes equally urgent with that for clothing, since the flocks are more extensively bred and sacrificed for the carcase. In Europe and the United States the number of sheep reared scarcely averages one per head to each of the population. It is only in thinly-settled districts, like the Cape colony and the interior African settlements, Australia, and the River Plate districts, that there is a large excess, and a yearly increasing extension in the exports of wool.

Glancing over the statistics of the past year, it is highly satisfactory to note the large increase in our imports of wool, which sets at rest the fears entertained, a year or two ago, of declining supplies. Although the foreign wools in this progressive increase, compared with the preceding years, have pushed a-head, and show greater strides than the colonial imports do; still there is a steady increase shown in the wool supplies from the colonies each year, of five or six million pounds. The total imports for the first eleven months of 1857 are equal to those of the whole twelve months of 1856. Of the imports, two-thirds were colonial wools, and one-third foreign.

In the colonial wools there is a decline in the receipts of upwards of 7,000 bales from Australia. The Cape show little alteration from the previous year's figures. From India and China there have been increased receipts to the extent of 10,000 bales. We firmly believe that there is a large scope for increased supplies of wool from India, Persia, and China; and more attention will doubtless be paid to the preparation of the fleece for market. Some of these long-stapled wools are already in good favour as a substitute for English combing wools.

Passing now to the European wools, we find an increase of about 21,000 bales from Russia.

The production of wool in Russia might be indefinitely extended. The Government has always fostered this branch of husbandry. Hundreds of thousands of acres of the unoccupied public lands have been given to those who would establish sheep folds on an extensive scale.

Too much attention is, however, paid in Russia to the increase of the flocks rather than the improvement of the breed of sheep. The washing and sorting of the wool are also performed with the greatest slovenliness. Lately the rearing of fine-woolled sheep has become an object of increased attention, and out of the total number of about 50,000,000 sheep in Russia, one-fifth are stated to be fine-woolled sheep.

There was an increase of 3,000 or 4,000 bales of wool from Portugal last year, and about 2,000 bales from Spain: these being chiefly forwarded to France. From Germany we received more than 7,000 bales less than in 1856. The production of wool there would seem to be stationary, if not retrograding, and is by no means adequate to the increasing domestic wants.

Remarks are freely made on a wretched practice which prevails in some parts of Germany and Hungary, and is also followed by the German and Dutch settlers in Southern Africa, and the Western States of America—namely, that of shearing twice in the year. This is both injurious to the animal and to the quality of the wool. Our South American supplies continue beyond an average, and in some instances show an excess: thus Peruvian and Alpaca wool is 8,000 bales in excess.

A rather singular item is the receipt of about 1,400 bags of wool the domestic growth of the United States, the first import of any extent for some years past; and this shipment probably arose out of the panic, and the desire to realize in this market. This wool will probably be reshipped with other supplies for the American market. Considerable attention is now paid to wool growing in the United States. American wool even surpasses many of the foreign wools for its felting properties, and for its suitability for making light or heavy broadcloth. Samples have been obtained from American flocks which contained 2,522 serrations to the inch, while the finest Saxony wools from Hungary will only contain about 2,400 serrations.

The unlimited extent of pasture available, with proper care and shelter, would ensure a large production of wool; but labour is dear and scarce, and large flocks can seldom or ever be kept. Still the number of sheep is greatly on the increase, and is computed at 29,000,000; while the production of wool must be fully 80,000,000 lbs.

Wool is much cultivated in the New England States, especially in Vermont. The Ohio wool-clip last year is estimated to have exceeded that of 1856 by at least three million pounds. The counties in the centre of that State are now as famous for their fine wool as they formerly were for their great crops of wheat.

America, however, does not produce enough wool even for home consumption. The alteration in the American tariff, which admitted in July last wools below 10d. per lb. in value, free of duty, further stimulated shipments across the Atlantic; although some of these arrived at an inopportune time, during the prevalence of the financial crisis.

Returning now to the trade circulars, we find that the consumption of wool has greatly increased in every quarter, and that the growth has not kept pace with it. In Germany however the production is almost stationary. From Australia there is a decline in the shipments, as compared with 1856, of 8,000 bales; and the quantity to come forward for the next sales is also very small. The manner in which prices have been supported, and the fact that, during a period of such unexampled pressure, a quantity of the value of one million sterling could be disposed of at the last public sales in November, at such satisfactory prices, prove the great demand. The home clip is computed to have been somewhat deficient in quantity, partly the consequence of increased demand for stock during the last two years, the improved position of the labouring classes enabling them to expend more in animal food. The consumption of domestic wools has at the same time very materially increased in the worsted districts. There has never (we are told) been a period when the population has been so fully employed, at such high wages, as during the past year. Consumption of woollen goods has, consequently, been unprecedentedly large; and, under all circumstances, there are reasonable grounds to hope this will continue to a fair extent. The continued increase in shipments for some years past has been very considerable; and although in the previous years they had reached a very high point, there is no reason to apprehend any falling-off. Notwithstanding the decline during the latter months, chiefly to the United States, the exports for the past year will greatly exceed any former period, and during the present year, we venture to assert, will show no diminution. A staple which, in its raw state, is worth annually here £7,000,000 or £8,000,000, and of which we ship manufactures to the value of £12,250,000, is necessarily one of high importance in an industrial point of view, and one in which many hands and much capital are engaged.

CENTRAL FARMERS' CLUB.

SUBJECTS FOR DISCUSSION, 1858.

FEBRUARY 1.—The Necessity of a Uniform System of Weights or Measure in the sale of Corn and other Agricultural Produce throughout England and Wales. Proposed by Mr. Owen Wallis, Overstone-Grange, Northampton.

MARCH 1.—The Cultivation and Storing of Mangel Wurzel, and the best modes of using it for Feeding and other purposes—Mr. R. Baker, Writtle, Chelmsford.

APRIL 5.—The Advantages of Guano for Root Crops, and the best System of applying it without injury to the Germination of Seed—Mr. W. Sainsbury, Manor House, West Lavington, Wilts.

MAY 3.—The Breeding, Rearing, and Management of Lambs, as a successful means of providing against Pleuro-Pneumonia and Consumption—Mr. J. Marshall, Riseholm, Lincoln.

JUNE 7.—The Benefit of Pulping or Mincing Roots for Cattle, Pigs, and Sheep—Mr. T. Fordham, Snelsmore Hill, Newbury.

NOVEMBER 1.—The Allotment System: its Uses and Abuses—Mr. H. Trethewy, Silsoe, Ampthill.

DECEMBER 6.—Stock Farming, on stiff retentive Soils—Mr. R. Bond, Kentwell, Long Melford, Suffolk.

*** The Discussions will commence at half-past 5 o'clock, P.M.

ROYAL AGRICULTURAL COLLEGE.

The Sessional Examination of this Institution was brought to a close on December 17th, when the following students obtained the college diploma, and became thereby members and graduates of the institution:—

John Aitken, Ayrshire.
John Dawson, Cragg House, Troutbeck, Windermere.
James F. Hawkesley, Bedfords, Havering-atte-Bower, Essex.
William M'Laughlin, Boraston, Tenbury.

We subjoin the names of those students who headed the examination lists in Practical Agriculture, the various sciences, &c.:—

PRACTICAL AGRICULTURE.—1st, Aitken; 2nd, Greenhill; 3rd, Robertson; 4th, Hills and M'Laughlin; 5th, Dawson and Hawksley; 6th, Duckworth, Horton, and Tomlin.

CHEMISTRY (Organic).—1st, Hawksley; 2nd, Aitken; 3rd, Foden; 4th, Greenhill; 5th, M'Laughlin; 6th, Lloyd and Dawson. (Inorganic).—1st, Gardner; 2nd, Lewis; 3rd, Cornwall; 4th, Lamb.

VETERINARY (First Division).—1st, Hawksley; 2nd, Dawson and Tomlin; 3rd, Aitken; 4th, M'Laughlin and Lloyd. (Second Division).—1st, Lewis; 2nd, H. James; 3rd, Lamb; 4th, Gardner; 5th, Nott.

NATURAL HISTORY (Botany).—1st, Aitken and Hawksley; 2nd, Dawson, Foden, Sayce, Lloyd, and M'Laughlin. (Agronomics).—1st, Cornwall and H. James; 2nd, Nott; 3rd, Jearrad and Adkins.

SURVEYING AND ENGINEERING (First Division).—1st, Hills and Aitkin; 2nd, Tomlin and M'Laughlin; 3rd, Dawson; 4th, Gardner; 5th, Hawksley. (Second Division).—1st, Cary; 2nd, Lewis and Nott; 3rd, Power and White.

PRIZES FOR FARM BOOKS AND JOURNALS.—1st, Gardner; 2nd, Horton; 3rd, Lloyd.

LABORATORY PRIZES.—Classes 1 and 2, H. S. Morgan; Classes 3 and 4, Lamb; Classes 5 and 6, Garratt. Highly commended, Rix and Yarker. Commended, Cornwall.

VETERINARY HOSPITAL JOURNALS.—1st, Hawksley; 2nd, Marrack and Greenhill.

ANATOMICAL NOTE BOOKS.—1st, Gardner; 2nd, Crofts and Lewis.

IMPORTANT DECISION IN THE COURT OF QUEEN'S BENCH,

BEFORE LORD CAMPBELL, AND JUSTICES COLERIDGE, WIGHTMAN, AND ERLE.

MOVEABLE STEAM ENGINES FOR FARMING PURPOSES NOT LIABLE TO TOLL.

THE QUEEN V. MALTY.

This was a case stated by the Worcestershire Quarter Sessions for the opinion of the Court, and which raised the question whether a moveable steam engine exclusively employed for the purpose of working thrashing machines was an "implement of husbandry," and, as such, exempt from toll in passing through a turnpike on a turnpike-road. It appeared from the case that the engine in question was drawn by horses, and was following a thrashing machine, also drawn by horses, and both were going to a farm at Upton-upon-Severn, to be employed in thrashing corn. The thrashing machine was allowed to pass through the gate free of toll, but toll was levied upon the steam engine, and the toll-keeper was subsequently convicted for improperly taking toll.

Mr. Powell, in support of the conviction, submitted that the steam engine was an implement of husbandry within the meaning of the act; and if not, that it was so necessarily associated with an implement of husbandry that it came within the spirit of the enactment, and consequently within the exemption. The Turnpike Act exempted, from toll, among other things, implements of husbandry. Under that statute considerable doubt existed as to whether thrashing machines were implements of husbandry; and the 38th of the 14 and 15 Vict., section 4, set that doubt at rest, by providing specifically that they should be so deemed. Dr. Johnson said "implement" was "an instrument of manufacture," and he (the learned counsel) contended that by virtue of the last statute the steam engine in this case was an implement of husbandry within that definition.

The court observed that the steam engine gave motive power to the thrashing machine, and did not actually form a part of it. The thrashing machine might be worked by the hand, by horse, or by water.

Mr. Stretton, on the other side, contended that as the steam machine could be used for giving motive power for printing, spinning, and many other purposes, the fact of its simply going along the road to work a thrashing machine did not make it an implement of husbandry.

Lord Campbell said the court could not be influenced by their opinion of the justice or policy of exemptions in favour of one class of her Majesty's subjects at the expense of another.

They were bound to give effect to the enactments of the legislature, and to see what it intended. Looking to the 3rd of George IV., he should have been inclined to think that a thrashing machine was an "implement of husbandry," and if it had not been for the introduction of the preceding words, "ploughs, harrows," &c., which applied immediately to the tilling of the soil, no doubt it would have been so considered. But the 14 and 15 Victoria, c. 38, provided that implements of husbandry should be deemed to include "thrashing machines;" and the question was, whether a steam engine which was to be used for working a thrashing machine, and for no other purpose, was entitled to exemption from toll. Here the thrashing machine and steam engine belonged to the same owner, were going to the same hirer, and were travelling together. If they had been united, and put into one cart, they would clearly have formed an implement of husbandry; and if the cart carrying the whole was exempted, he thought that a horse drawing a part must be exempted also. But he did limit his opinion to the coincidence of circumstances in this case. He thought that if the steam engine had been going by itself for the purpose of working a thrashing machine belonging to a farmer, it would still have been an implement of husbandry, and entitled to exemption. It came clearly within Dr. Johnson's definition. It was immaterial to say that the steam engine might be employed for some other purposes, because if those purposes were unconnected with husbandry it would be liable to toll. Looking to the fair construction of the Act of Parliament, and what the legislature intended, he thought the exemption in this case ought to be allowed.

The other judges concurring, the conviction was affirmed.

CALENDAR OF AGRICULTURE.

This month is generally very favourable for the operation of ploughing, which must be pushed vigorously in leys and stubbles, and in subsoiling. If the weather be unfavourable, and frosts and snows prevail, continue the work of carting, as directed last month. Feed all live stock regularly and amply, and thrash frequently, in order to afford fresh straw.

In mild weather, pull and store turnips, which are now used in the succession of green rounds and swedes. Give oilcake to the cattle along with the turnips, and salt to the sheep.

Ewes will now require good shelter and juicy food, as the lambing season will commence. Much attention must be paid to young animals at this season: feed the dam, and she will suckle her young.

Lay dung on grass lands; when dry, bush harrow and roll, and pick off by hand all stones and rubbish. Spread mole-hills and tufts of dung, and put gates and fences in order. Float meadows.

During the whole month, fell timber and cut underwoods; splash hedges, and plant new ones. Plant all kinds of forest trees, and cut over those planted last year, as the new saplings that spring from the stems are very vigorous in growth, and often replace a stunted vegetation. Cut open ditches in plantations, and fence well against summer grazing. Fill vacancies in each year's planting of trees.

Open the hills on hop-grounds, and apply strong manures, as rotten dung, brines, and oleaginous substances; dress the roots, and plant in beds the shoots that are cut off, to come on for sets. Collect and prepare all kinds of artificial manures.

In fine seasons, the sowing of grains will commence in the early districts. Sow beans and peas, oats and barley, and spring wheat; sow spring vetches for horses and sheep feed. Sow, on warm and well-prepared beds of ground, cabbage seed, for plants to be set in the field in May and June for a crop.

WHEAT PRICES FOR THE LAST FOUR YEARS.—A correspondent writes as follows:—"As the wheat trade has undergone considerable fluctuations during the last four years, it is interesting to note the monthly changes in the official average of prices. The following table exhibits these variations at a glance:

Month.	1854.		1855.		1856.		1857.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
January....	80	1....	72	5....	76	6....	58	7
February ..	80	10....	70	4....	72	6....	56	0
March	78	9....	67	8....	68	11....	55	6
April	77	2....	68	5....	68	8....	58	8
May	78	10....	78	11....	68	0....	56	7
June	78	8....	76	11....	69	6....	60	1
July	74	0....	76	5....	76	1....	68	5
August	68	7....	76	8....	72	10....	59	7
September..	56	7....	75	9....	67	10....	57	1
October	57	11....	77	0....	65	5....	55	6
November ..	71	10....	80	10....	64	1....	51	8
December ..	78	1....	80	1....	60	8....	48	7
Average....	72	7....	74	8....	69	3....	56	4

STORING OF TURNIPS.—A correspondent of the *Irish Farmers' Gazette* writes as follows: "Having had occasion to raise a quantity of swedes early in November, for the purpose of sowing wheat, I formed a small pit, tapering to the top, and thatched it securely with a quantity of barley straw, enough to exclude all effects of rain, wind, or frost. The remainder, about 50 tons, I formed in one large pit, about six feet wide at base, four feet high, and three feet wide at top: this remained exposed for a few days, when it received a light coat of turnip leaves, which soon became decomposed, leaving the roots in many places quite exposed. Now for the result. In the pit, which was securely thatched, at least one-half of the roots have decayed, and in that which was exposed to wind and rain they are quite sound. In the latter case I acted under the directions of a large farmer in this neighbourhood, who raises all his turnips in November, and never covers them save with a few of their own leaves, putting them invariably in an exposed position. My reason for touching on this subject is, that in all agricultural works we are advised to choose a dry and sheltered locality for turnips, taking care to have them securely thatched."

DEATH OF MR. STEPHEN MILLS.—It is with sincere and heartfelt regret that we this day record the death of Mr. Stephen Mills; and in this regret our readers generally, we believe, will participate. There is no name more familiar to the county of Wilts than that of Stephen Mills; and there is no man who is more universally respected than he was. Mr. Mills was one of the most extensive agriculturists in England: the farms that he occupied comprised nearly 4,000 acres; and during the recent visit of the Royal Agricultural Society at Salisbury, a large party of gentlemen from different parts of the kingdom took the opportunity of inspecting those farms, and acknowledged the high gratification they had received. The party was afterwards munificently entertained by Mr. Mills; and the thanks of the Royal Agricultural Society were given him for his liberality. Although possessed of much wealth, and of great intelligence, he had no aspirations beyond his station. Affable, friendly, and kind to all round him, his pride and pleasure were in his occupation, and he certainly attained eminence as an English farmer. He possessed some of the best qualities that can adorn the man; and in the discharge of the relative duties belonging to husband, father, master, and neighbour, his conduct was most exemplary—his numerous labourers sorrowing for his death as for the death of an only friend. Above all, he led the life of a Christian—he died the death of a Christian—and there is well-grounded hope that he has gone to receive the reward of a Christian. This, then, will be the highest source of consolation to his bereaved and afflicted family.—*Devizes Gazette.*

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JANUARY.

For the time of year this has been a remarkably fine month. Throughout the country rapid progress has been made in all agricultural operations, which are now in a more forward state than at almost any previous corresponding period. Everywhere, the winter wheats are looking remarkably well; indeed, scarcely a complaint on this head has reached us from any quarter. Thus far, matters are satisfactory enough; but when we turn to the question of the value of wheat, we are compelled to draw rather an unfavourable picture. That grain, notwithstanding that our leading provincial markets have been but moderately supplied with home-grown produce, has met a dull inquiry, and which has resulted in a continuous decline in value. The cause of the present decline, however, is easily traced. In the first place we may observe that, owing to the mildness of the weather, the holders of wheat at Hambro' and some other ports have been enabled to forward large supplies, with orders for immediate sale. Apparently, therefore, the holders in the North of Europe have taken alarm at the prospect held out to them as regards the future, and are turning their produce into money, without waiting the result of our spring trade. Whether this is sound policy, time alone will determine; but our impression is that forced sales at the present moment are highly injudicious, more especially as money in the discount market is unusually cheap and very plentiful, and that prices have been run down far beneath their ordinary level. In the next place, holders of foreign wheat, both in London and at the outports, have shown signs of uneasiness, owing to the heaviness in the various markets in France, and the strenuous efforts making by the French millers to induce parties here to speculate in flour. These efforts have as yet been unsuccessful; but it is a debateable question how long prices either here or on the Continent will show a tendency to decline. And here we may remark that much misapprehension exists in some quarters as regards the exports of produce from France. Some persons have imagined that they are wholly free of duty; but such is not the case, and we here give a practical view of the working of the new export scale of duties: When the average price of wheat in the markets of Saumer, Nantes, and Marans, which establishes the duty for the third section of the third class (say for all the ports between Nantes and Rochefort, inclusive), does not exceed 21f. per hectclitre on wheat, the duty remains nominally as at present, say, 30c. per hectolitre on wheat, and 60c. per 100 kilos on flour. Any advance upon 21f. up to 22f. raises the duty 2f. 40c. on wheat, and 4f. 80c. on flour: in a similar manner, every subsequent advance of a franc increases the duty by 2f. 40c. on wheat, and 4f. 80c. on flour. Thus, if the average price at the markets named should be from 22f. 1c. to 23f. per hectolitre, the duty would be 4f. 80c. per hectolitre on wheat, and 9f. 60c. on flour. The working is similar as respects barley, rye, Indian corn, oats, and buckwheat, the only difference being the price at which the nominal duty changes; hence, any steady upward movement in the quotations would almost immediately lead to a stoppage to the export trade, unless, indeed, prices in this country were rapidly to advance in proportion. Up to this time the quantity of grain and flour received from France has been trifling, and whilst the trade here continued heavy, any increase in the receipts cannot be anticipated, more especially as our farmers now hold an unusually large quantity of wheat of last year's growth, and that, too, of very fine quality. The failure of the potato crop has led to an advance in the value of the best potatoes to *nine pounds* per ton. We perceive, then, that a second quality of food is now positively dearer than good and useful flour, which may be purchased at £8 per ton. From the Continent very few potatoes can now reach us, as the stocks are nearly exhausted, and the supplies in the hands of the growers, both in England and Scotland, are reduced to a narrow compass. Although the consumption of bread in our manufacturing districts has somewhat decreased, owing to the late severe commercial panic, we are of opinion that wheat is now selling at prices far beneath its actual value. The barley trade has been in an unsatisfactory state, and the quotations have continued to give way, in consequence of large importations from the Continent, and the comparatively small supplies taken by the distillers.

Our fat stock markets have ruled heavy throughout the month, and prices generally have given way, notwithstanding that the importations of beast and sheep from abroad have continued trifling. The health of the stock in our leading counties continues good, and the supply of winter food is abundant. After a severe fall in prices, and a great depression in the trade, wool has somewhat recovered itself. At present, however, we have no advance to notice in prices; but there is every prospect of the demand improving, as the stocks held by the manufacturers, both here and on the Continent, are unusually limited.

For good and fine hops, the demand has been rather active, and prices have advanced from 8s. to 5s. per cwt. In all other kinds, however, very little has been passing, at about previous currencies. The supplies in the hands of the factors are very large for the time of year.

Both hay and straw have come freely to hand, and we have no improvement to notice in the trade. Meadow hay has sold at from £2 10s. to £4; clover ditto, £3 10s. to £5; and straw, £1 5s. to £1 10s. per load. The quantities of hay now on hand are by no means so extensive as they were at this period in 1857.

The agricultural advices from Scotland are favourable. Outdoor labours generally are sufficiently forward, but the wheat trade has sympathised with the demand in the south. All spring corn has moved off slowly, and prices have given way. The shipments of produce to the south have been tolerably extensive.

Throughout Ireland, wheat and most other articles have moved off heavily, on easier terms. The imports of foreign grain have been liberal, and the exports to England small. The stocks of produce at the various ports are only moderate.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that only moderate supplies of beasts have been on sale in our leading cattle markets, and that the imports of stock from the Continent have been on a very limited scale, the beef trade has been in a most unsatisfactory state throughout the month. The fall in prices, however, has not been extensive; but evidently the butchers have purchased with more than usual caution. As regards sheep, we may state that the inquiry for all breeds has continued restrictive, and that a fall of fully 2d. per 8lbs. has taken place in the quotations. Calves, however, have ruled steady; but the value of pigs has continued to give way.

That the late commercial panic has led to a considerable decrease in the consumption of meat in the manufacturing districts, is evident from the enormous quantities of beef, mutton, and pork which have lately reached Newgate and Leadenhall markets from some of the midland counties, which, in some seasons, send large supplies to Manchester, Birmingham, &c. The falling off in the demand for butchers' meat in those marts of industry has compelled those who slaughter extensively to forward to the metropolis. Large additions to the metropolitan supplies have of necessity influenced the value of live stock in the other markets, and prices in Newgate and Leadenhall have been considerably more in favour of buyers than elsewhere. Commercial distress, then, has allowed the production of live stock to exceed the consumption; and, although commerce is slowly improving, we see no reason to look forward to what may be termed brisk markets, or high prices for a considerable period. Against any rapid improvement in the value of live stock, we may place the low price of bread throughout the country; and until our operatives become fully employed, the consumption of food must remain stationary. We think that the theory that production of late years has not kept pace with the demand has wholly exploded: indeed, it would seem preposterous to suppose that the high quotations at which both beasts and sheep have been selling during the last two or three years should not, even in the usual course of trade, have stimulated our breeders to increased exertions. In Holland there is, apparently, a marked change in the system of rearing stock for foreign markets—certainly for our own. That country has, apparently, been drained of its superfluous stock, owing to the immense numbers of beasts and sheep purchased for France, to meet the wants of the people during the last three or four years. We believe, therefore, that prices here will be very little influenced by the amount of supply which the Dutch graziers will have to spare for us during the whole of the present year. From Holstein, we shall, no doubt, receive our customary supplies; but, in a general way, they are not of a quality likely to have much effect upon the prices of good stock. During last month, the following supplies were imported into London from abroad:—

Beasts	 432	head.
Sheep	 1,307	"
Calves	 603	"
Total	.. 2,342	

In January, 1857, the total arrivals amounted to 4,633; in 1856, to 3,292; in 1855, 9,102; in 1854, 7,919; in 1853, 12,847; and in 1852, to 10,567 head. Thus, it will be seen that the arrivals last month were smaller than in the six previous years.

The total supplies of stock exhibited in the Great Metropolitan Market in January were as follows:—

Beasts	20,312	head.
Cows	572	"
Sheep	80,742	"
Calves	1,108	"
Pigs	1,759	"

COMPARISON OF SUPPLIES.

Jan.	Beasts.	Cows.	Sheep.	Calves.	Pigs.
1857....	19,949	355	81,200	1,071	2,355
1856....	17,532	435	101,600	757	2,930
1855....	19,717	500	120,470	962	2,625
1854....	19,687	510	95,080	887	2,279
1853....	20,717	480	96,800	2,148	2,360

Beef has sold at from 3s. 2d. to 4s. 6d.; mutton, 3s. 4d. to 5s. 4d.; veal, 4s. to 5s. 4d.; pork, 3s. 6d. to 4s. 10d. per 8 lbs. by the carcase.

COMPARISON OF PRICES.

	Jan., 1854.					Jan., 1855.				
	s.	d.		s.	d.	s.	d.		s.	d.
Beef, from	3	0	to	4	10	3	2	to	5	0
Mutton	3	2	—	5	4	3	4	—	5	0
Veal	3	4	—	5	6	4	2	—	6	0
Pork	3	4	—	4	10	3	0	—	4	4
	Jan., 1856.					Jan., 1857.				
	s.	d.		s.	d.	s.	d.		s.	d.
Beef, from	2	10	to	4	10	3	4	to	5	2
Mutton	2	10	—	5	0	3	8	—	5	6
Veal	4	2	—	6	0	3	8	—	6	0
Pork	3	8	—	5	0	3	8	—	5	2

The closing prices of last month show a decline of 6d. per 8lbs. in the value of beef, of 4d. in mutton, of 10d. in veal, and 6d. in pork, compared with January, 1857.

Last month the arrivals of beasts up to the Great Metropolitan Market, from Norfolk, Suffolk, Essex, and Cambridgeshire, were about 9,000 Scots and shorthorns; from Lincolnshire, Leicestershire, and Northamptonshire, 4,000 shorthorns; from other parts of England, 1,550 of various breeds; from Scotland, 2,800 Scots; and from Ireland, 1,340 oxen.

In Newgate and Leadenhall markets, which have been abundantly supplied, the trade has ruled heavy, as follows: Beef from 2s. 10d. to 4s. 2d., mutton 3s. to 4s. 8d., veal 3s. 6d. to 4s. 8d., and pork 3s. 2d. to 4s. 8d. per 8lbs. by the carcase.

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

The first month of the new year was characterized throughout by the almost total absence of rain. The temperature has greatly varied; four days at nearly the commencement being very frosty, these suddenly giving way to great mildness, which was followed by cold nights, and eventually by a thoroughly wintry aspect. The dryness of the subsoil has preserved the well-grown wheat plant in health, and the timely appearance of frost has kept it from undue luxuriance, so that it is generally agreed a very fair prospect is on the ground. In the near and southern countries of Europe, as well as on the African coast, the same promise is reported. The first turn of the year showed some tone in the markets, with a slight advance, and the frost led many to thresh freely; but the sudden thaw greatly deteriorating the condition of the larger quantity on show, coupled with the general prostration of trade produced by the late severe crisis, has thrown the markets back to their former dulness, and the balance of the month has been against sellers about 2s. per qr. Future prices must be influenced by foreign arrivals; and these of late having been liberal, through the excessive mildness of the weather, which has kept the Baltic and the northern ports open, millers have had such an abundant choice of samples, that they have partly been independent of English supplies. The return of cold weather, may for a time, lessen their amount; but the universally good wheat crop, and the general monetary pressure seem likely to renew the abundance in spring, and certainly abate the prospect of a much better remuneration to English growers. The failure of the potato crop is, however, likely to be then felt; and should any mishap occur to the growing crops, there would be nothing to fall back upon but the surplus growth of one favourable season. The circumstance that the French markets rather decline at present, is little to be depended on, for they are not sufficiently low to leave a margin for profitable shipments here, and France, with her numerous population and large consumption, may require much foreign produce before the new harvest. From America some quantity may come; stocks at New York having somewhat accumulated, and but a small portion of the western growth being used up; but the markets are yet comparatively firm, and the effects of the crisis seem passing away. The following quotations from foreign markets show the relative difference with our own. The price of fair wheat at Paris was 41s. 6d. to 42s. 6d. per qr.; but on the coast at Nantes, red wheat was 43s. to 44s. per qr. At Marseilles, African hard was worth 50s. per qr.; Polish, 36s. per qr. Good red wheat at Antwerp was quoted 44s. to 45s., white to 46s. per qr. Rotterdam quotations were 35s. 6d. to 44s. 9d. per qr. At Hambro' wheat on the spot was 45s. 9d., of good quality. The rates at Stettin were 38s. to about 42s. per qr. The best wheat at Dantsic was worth 47s. per qr. Spain, with a much better crop than last year, requires imports. Seville, after a heavy fall, still quotes 55s. per qr. for native white or Blanquillo wheat. The port of Odessa has continued open, and with many vessels arrived, 40s. 6d. per qr. has been made of Ghirka wheat free on board, worth in London only about 43s. per qr., after payment of freight, duty, and expenses. Soft wheat at Constantinople was quoted 41s. 6d. per qr. At Berdianski, where the port is closed by frost, with a stock of 40,000 qrs., the top price of red wheat was 42s. 9d. per qr., worth 46s. to 47s. per qr. in London. The inferior white wheat of Egypt was worth about 28s. per qr. at Alexandria, while in this port the value is about 32s. or 33s. per qr.

White Southern wheat at New York was quoted 1 dol. 30 c. per bush., equal to 44s. per qr., red 1 dol. 15 c., equal to 39s. 7d. per qr., on which 8s. per qr. should be placed for freight, duty, and expenses; so that there is scarcely a foreign port with which a profitable business offers. Still the love of adventure, and the pressure on holders when buyers are wanting, may bring good arrivals.

The first Monday in London commenced on the back of good foreign supplies, with but moderate arrivals of home growth. The morning's show from the near counties was small, and there being every appearance of a frost, the best samples in good condition, red especially, obtained 1s. to 2s. more money; inferior sorts were, nevertheless, neglected, though offered at former rates. In foreign the sorts most in demand were new Baltic and Hambro' red, which obtained an advance of 1s., other descriptions being without improvement. The country markets generally responded fully to the London advices; Hull, Birmingham, and Gloucester were 1s. dearer; Boston, Lynn, Newark, and Bristol, were severally 1s. to 2s. per qr. improved; Sleaford, Gainsborough, and Spalding noting fully 2s. advance. The only improved market at Liverpool was that held on Tuesday, when quotations were raised 2d. to 3d. per 70lbs.

The second Monday exceeded the first in foreign supplies, with about an equal quantity of English growth. From Kent the morning's show of samples was good, from Essex only moderate; but the sudden return of a very mild damp atmosphere greatly affecting the condition of the wheat, town millers held aloof, and would only buy at lower prices—say 1s. to 2s. per qr. These offers were generally declined at the Essex stands, but accepted at the Kentish; so that a good part was left over to the chances of next day. The better supply of foreign at such a time influenced some holders, who accepted a similar reduction to clear their cargoes ex ship. On the following day those factors who had declined placing on lower terms agreed to the abatement, and placed their samples without gaining any advantage. Some of the country markets little altered their quotations, as Sheffield, Newmarket, and Portsmouth. More conceded 1s. per qr., as Leeds, Gainsborough, Newark, and Bristol. Hull, Birmingham, and some others, noted the same decline as London, and Wakefield was fully 2s. per qr. down. Liverpool, on Tuesday, gave way 2d. to 3d. per 70lbs., and on Friday there was a further fall of 1d. to 2d. per 70lbs.

The third Monday showed increased arrivals, and though the weather was less damp, and frosty nights had set in, there was no reaction from the previous dulness; for though Kent and Essex made but moderate contributions towards the morning's supply, about another 1s. per qr. abatement ensued, the sales of foreign being very limited at a similar decline. Hull, Boston, Lynn, Leicester, Bristol, and other country markets, were also 1s. per qr. lower; but Louth, St. Ives, and Market Rasen did not quote changed prices. Sheffield, Gloucester, and Portsmouth were down 2s. per qr. Liverpool, on Tuesday, was 3d. per 70lbs. cheaper, but evinced more tone at the week's close.

The fourth Monday had less additional foreign, but rather more English wheat generally, though Kent and Essex combined showed but few samples in the course of the day. The royal marriage taking place this day had its influence on trade, there being but a slight attendance; and as town millers had agreed to lower the price of their best flour, there was very little done. The Kentish hoymen were willing to accept 1s. per qr. less, to clear their stands; but Essex factors scarcely lowered their terms, the quantities on hand being small. The prices of foreign were not changed: but sales were entirely retail and partial. Liverpool on Tuesday did not alter prices, but Leeds was 1s. per qr. lower. The foreign arrivals during the four weeks, into London, were 66,644 qrs.; the English, 13,618 qrs.; giving an average weekly supply of 20,065 qrs., which shows a slight increase over the previous month. The month's total exports were only 500 qrs. wheat, 161 qrs. oats, 20 qrs. beans. The foreign supplies for the United Kingdom in Dec. were 486,299 qrs. wheat, 509,811 cwt. flour. During the four weeks in January, the imports into the principal ports of Great Britain, in wheat and flour, were 344,716 qrs. The principal change in the flour trade has been in the best quality town-made, which, up to the fourth Monday, was 47s. per sack, and then reduced to 43s. per sack. In Norfolks there have been slight fluctuations; but the total decline has been only 1s. per sack, the month commencing at 33s., and closing at 32s. American and French samples have been offering at gradually easier rates, though the importation of neither has been heavy. In country flour, the receipts of the four weeks have been 71,217 sacks: in American barrels, 20,696; and in foreign sacks (principally French), 9,570 sacks; giving a weekly average of 20,196 sacks 5,174 brls., which shows some deficiency as respects last month's supplies. In Paris, the fine four marks of the best makers is quoted at 48f. 50c., = 31s. 4d. per sack English; but the expense of transit to the coast, with freight, and English and French duties, &c., leaves little inducement to import, as 38s. here could scarcely be depended on.

The barley trade throughout the month has been heavy, with generally declining prices. The first Monday opened cheerfully, with 1s. per qr. advance on malting descriptions, and some improvement on secondary and grinding sorts; but this was the only market with the slightest animation, the second Monday losing the previous advance on fine descriptions; the third still further declining on distilling qualities; and the last being the heaviest of all, with a downward tendency for anything but picked samples for maltsters. This dulness has not arisen from overwhelming supplies, as the receipts have been below those of last month; but the sale of malt being slow and difficult has affected the best samples, while the low prices of maize, oats, and beans have made the cheaper descriptions less in request. It now seems too late to expect any rally in malting sorts; but as we have never found the foreign importation beyond the demand, as feeding sorts get scarce towards the season's close, we think an improvement very likely. The four weeks' supply has been in English sorts, 14,570 qrs.; in foreign, 39,536—giving a weekly average of 13,526 qrs.

The malt trade, as already noted, has been limited, but prices have scarcely varied through the month, 70s. being about the highest quotation for fine pale.

Oats are the only article in corn which show some advance in prices in the month's course, and this has arisen entirely from the unusual smallness of the supplies. The balance of the month's fluctuation shows 1s. per qr. in their favour. The first Monday was 6d. per qr. dearer, having the smallest show of any on board ship; the second also showed a further rise of 6d. to 1s. per qr.; the third was quiet on increased arrivals; and the last, with only an average quantity, yielded 6d. per qr. on foreign, and 1s. per qr. on Scotch samples. There remain on hand many granary samples of an inferior kind; and till these are cleared, moderate arrivals must have their influence; but as the season advances we rather look for higher rates than otherwise, from the extensiveness of the demand, and the deficiency of the English and Irish crops as to quantity. The four weeks' arrivals in London have been as follows: Of English, there were 3,659 qrs.; of Scotch, 7,689 qrs.; of Irish, 3,158 qrs.; of Foreign, 43,535 qrs.—in all supplying an average of only 14,510 qrs. per week, and being 6,400 qrs. weekly less than during last month.

The bean trade has been heavy, from the mildness of the season and largeness of foreign arrivals; the only change noted as to value was a fall of 1s. per qr. on the last day. The supplies have been 2,728 qrs. of English and 12,762 qrs. of foreign, showing 3,872 qrs. per week, or 340 qrs. weekly beyond last month.

The supply of peas has been very short, with prices unaltered; the demand for boilers being very limited, through the comparative absence of frost and the high rates of duns and maples, leading to other substitutes in preference to paying any further advance. Of English samples there were but 1,710 qrs., of foreign only 243 qrs., giving an average of only 488 qrs.

Linseed, with moderate arrivals, having attracted attention from the late decline, has rather rallied, and an advance of 1s. to 2s. in the course of the month must be noted. Cakes, without being dearer, have found a very ready sale.

The trade in cloverseed having approached its season, has improved, and foreign, as well as English red, has commanded higher rates, though buyers are neither numerous nor eager. In France there has been no excitement; but some advance has taken place in Germany. Good new Bordeaux red here, of which some has arrived, is worth about 65s.; extra purple English, of which little has yet appeared, 75s. to 80s.; fine white is also inquired for, and trefoil commands fully former prices. Canaryseed has been dull, as well as mustardseed. Hempseed, rapeseed, coriander, and carraway have continued a slow sale, with little alteration in value.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, new, Essex and Kent, white	43 to	52	red	41 to	49
Norfolk, Linc. and Yorks., red				41	49
BARLEY, malting	34 to	37	Chevalier, new	37	40
Distilling	32	35	Grinding	26	30
MALT, Essex, Norfolk, and Suffolk	60	66	extra	68	—
Kingston, Ware, and town made	60	66	,,	68	—
Brown	55	56		68	—
RYE	—	—		30	34
OATS, English, feed	20	24	Potato	26	33
Scotch, feed	20	25	Potato	25	32
Irish, feed, white	20	22	fine	24	31
Ditto, black	19	21	,,	—	24
BEANS, Mazagan	32	34	Ticks	33	34
Harrow	33	35	Pigeon	37	40
PEAS, white boilers .. 40 44 .. Maple	41	43	Grey	39	41
FLOUR, per sack of 280lbs., Town, Households .. 38s.,			fine	40	43
Country	33	34	Households	37	38
Norfolk and Suffolk, ex-ship				31	32

FOREIGN GRAIN.

Shillings per Quarter.

WHEAT, Dantzic, mixed	50	—	high do.	—	—	extra	—	56
Konigsberg	45	51	,,	—	—		—	—
Rostock	46	—	fine	50	—		—	—
American, white	46	51	red	44	48		—	—
Pomera., Meckbg., & Uckermrk, red				44	49		—	—
Silesian, red	43	48				white	48	50
Danish and Holstein							42	46
Russian, hard	42	48				French	(none)	
St. Petersburg and Riga							40	46
Rhine and Belgium							—	49
BARLEY, grinding	24	29				Distilling	32	34
OATS, Dutch, brew, and Polands				21	29	Feed	20	26
Danish and Swedish, feed				21	25	Stralsund	22	26
Russian							20	23
BEANS, Friesland and Holstein							34	35
Konigsberg				31	35	Egyptian	33	34
PEAS, feeding				37	40	fine boilers	40	42
INDIAN CORN, white				34	35	yellow	34	35
FLOUR, per sack			French	38	40	Spanish	—	—
American, per barrel, sour				20	23	sweet	24	27

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS:	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Dec. 12, 1857	49	5	36	5	22	3	34	1	41	1	41	2
Dec. 19, 1857	49	3	37	0	22	8	35	7	40	3	40	5
Dec. 26, 1857	47	5	35	11	22	2	31	6	39	7	40	9
Jan. 2, 1858	47	7	36	6	22	3	32	1	39	3	39	4
Jan. 9, 1858	47	10	36	3	22	8	33	6	39	3	40	5
Jan. 16, 1858	48	8	37	0	22	1	33	7	39	3	39	11
Aggregate average	48	4	36	5	22	8	33	5	39	9	40	4
Sametime last year	59	5	44	3	23	10	40	0	42	0	40	6

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat	117,485 qrs.,	48	8	Wheat	103,258 qrs.,	59	4
Barley	104,286 ..	37	0	Barley	98,323 ..	45	7
Oats	11,231 ..	22	1	Oats	15,251 ..	23	4
Rye	7 ..	33	7	Rye	117 ..	40	2
Beans	5,266 ..	39	3	Beans	6,132 ..	40	5
Peas	1,771 ..	39	11	Peas	2,531 ..	39	6

PRICES OF SEEDS.

BRITISH SEEDS.

TARES, new, per bushel..................5s. 0d. to 5s. 9d.
MUSTARDSEED, per bush., new 15s. to 17s., brown 12s. to 15s.
CORIANDER, per cwt................................ 20s. to 30s.
CANARY, per qr..................................... 80s. to 86s.
LINSEED, per qr., sowing —s. to —s...crushing 60s. to 62s.
LINSEED CAKES, per ton .... £10 0s. to £10 10s.
RAPESEED, per qr.................................. 68s. to 70s.
RAPE CAKE, per ton......................£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

TARES, per bushel .... 0s. 0d. to 0s. 0d.
HEMPSEED, small, per qr. .... —s. to 40s...Do. Dutch 42s.
CORIANDER, per cwt............................ 15s. to 25s.
CARRAWAY ,, ... 44s. to 46s.
LINSEED, per qr., Baltic 58s. to 59s.....Bombay 57s. to 59s.
LINSEED CAKE, per ton................. £9 10s. to £10 10s.
RAPESEED, Dutch .... 76s. to 80s.
RAPE CAKE, per ton ....£5 0s. to £5 10s.

HOP MARKET.

BOROUGH, MONDAY, Jan. 25.—We have rather less business passing in our market; prices are, however, firmly maintained, and for the finest samples the tendency towards improvement is still observable. Our currency is as follows:—

Mid and East Kents	70s. to 90s.	choice	120s.
Weald of Kents	56s. to 63s.	,,	70s.
Sussex	52s. to 58s.	,,	63s.
Yearlings, &c.	21s. to 35s.	,,	50s

MEASE and WILD.

POTATO MARKETS.

SOUTHWARK WATERSIDE, MONDAY, Jan. 25.—During the past week the arrivals coastwise have been fair, but limited from abroad; the trade has been more lively, and a little more money has been made for fresh samples. The following are this day's quotations:

Yorkshire Regents	120s. to 180s.	per ton.
Lincolnshire do.	120s. to 150s.	,,
Dunbar do.	120s. to 160s.	,,
Do. reds	85s. to 90s.	,,
Perth, Fife, and Forfar Regents	100s. to 120s.	,,
Ditto ditto reds	70s. to 80s.	,,
French whites	75s. to 85s.	,,
Belgian do.	70s. to 75s.	,,
Do. reds	75s. to 90s.	,,
Dutch whites	70s. to 90s.	,,

BOROUGH AND SPITALFIELDS.

LONDON, MONDAY, Jan. 25.—Coastwise and by land-carriage, very moderate supplies of Potatoes have come to hand since Monday last; and the imports from abroad have been rather limited—viz., 2 tons from Rotterdam, 516 tons from Rouen, 30 tons from Antwerp, 107 tons from Calais, 3 tons from Ostend, and 247 tons from Dunkirk. Selected samples are dearer, and other kinds rule steady in price.

York Regents	120s. to 180s.	per ton.
Kent and Essex do.	100s. to 140s.	,,
Scotch	80s. to 120s.	,,
Do. Cups	75s. to 85s.	,,
Middlings	50s. to 60s.	,,
Lincolns	120s. to 150s.	,,
Blues	65s. to 85s.	,,
Foreign	65s. to 95s.	,,

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland	126 to	128	Cheshire	66	76
Kiel	126	130	Cheddar	72	82
Dorset	112	124	Double Gloucester	58	68
Carlow	104	120	HAMS:		
Waterford	—	94	York	80	90
Cork,	—	114	Westmoreland	80	90
Limerick	98	102	Irish	74	86
Sligo	104	112	BACON: Wiltshire, dried	58	64
FRESH, per dozen..13s.0d to 16s.0d.			Irish, green	54	58

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, Jan. 25.—Since Monday last there have been increased inquiries for good and fine fleeces, at full prices. All other kinds of wool continue dull in sale. There is, however, every prospect of a steady revival in the trade, as dealers generally hold unusually light stocks for the time of year.

Per pack of 240lbs.

Fleeces—Southdown Hogs	£13	0 to	£13	10
Do. Half-bred Hogs	12	0	12	10
Do. Kent	13	10	14	0
Do. Southdown Ewes and Wethers	13	0	00	0
Do. Leicester do.	13	0	14	0
Sorts—Clothing, picklock	15	0	16	10
Do. Prime and picklock	14	10	15	0
Do. Choice	13	10	14	0
Do. Super	12	0	13	0
Do. Combing—Wether matching	15	10	16	0
Do. Picklock	13	0	14	0
Do. Common	12	0	12	10
Do. Hog matching	16	0	16	10
Do. Picklock matching	14	0	15	0
Do. Super do:	12	0	12	10

FOREIGN AND COLONIAL WOOL MARKET.

Per lb.	s.	d.	s.	d.
German, Saxon, and Prussian. 1st and 2nd Elect	3	4 to	4	6
Prima	2	4	3	0
Secunda	2	0	2	4
Tertia	1	8	1	10
COLONIAL:—SYDNEY—Lambs	1	5½	2	1½
Scoured do.	1	4½	2	8
Unwashed	0	9½	1	6
Locks and Pieces	0	10	1	9
Slipe and Skin	1	4	1	9
PORT PHILIP—Lambs	1	4	2	1
Scoured do.	1	2½	2	3½
Unwashed	0	6	1	[illegible]
Locks and Pieces	1	1	1	7½
Slipe and Skin	0	8½	1	6½
S. AUSTRALIAN—Lambs	1	4	1	9
Scoured do.	1	3	2	2
Unwashed	0	9	0	11
Locks and Pieces	0	7	1	2
V. D. LAND—Lambs	1	5½	1	11
Scoured do.	1	5	2	8
Unwashed	1	1½	1	3
Locks and Pieces	1	0	1	6
CAPE OF GOOD HOPE—Fleeces	0	11	2	0
Lambs	0	11	1	10
Scoured	0	8	1	10
Unwashed	0	7½	1	3

MANURES.

PRICES CURRENT OF GUANO, &c.

PERUVIAN GUANO, (per ton, for 30 tons) nominal	£13	5	0 to	£0	0	0
Do. Do. (under 30 tons)	14	0	0	0	0	0
BOLIVIAN GUANO none	0	0	0	0	0	0

ARTIFICIAL MANURES, &c.

				£ s. d.	£ s. d.
Nitrate Soda (per ton)	£22 0 0 to	[illegible]	Sulph. of Copper or Roman Vitriol, for Wheat steeping	45 0 0 to	47 0 0
Nitrate Potash or Saltpetre	29 0 0	30 0 0	Salt	1 5 0	2 0 0
Sulpht. Ammonia	21 0 0	22 0 0	Bones, Dust, per qr.	1 5 0	1 6 0
Muriate ditto	27 0 0	28 0 0	Do. ½-inch	1 4 0	1 5 0
Superphospht. of Lime	6 0 0	9 0 0	Oil Vitriol, concentrated, per lb.	0 0 1	0 0 0
Soda Ash, or Alkali	9 0 0	10 0 0	Do. Brown	0 0 0½	0 0 0
Gypsum	2 0 0	2 10 0			
Coprolite	3 15 0	4 0 0			

OIL-CAKES.

Linseed-cakes, per ton—			Marseilles (none)	£0 0 0 to	£0 0 0
Thin American, in brls. or bags	£10 15 0	£11 10 0	English	10 10 0	11 0 0
Thick do. round	10 5 0	0 0 0	Rape-cakes, pr ton	6 5 0	6 10 0

JOHN KEEN, 35, Leadenhall-street,
(Late Odams, Pickford, and Keen.)

Williams & Co., 24, Mark Lane—Azotic......................£6 10 0

Manufactured by Hodgson & Simpson, Wakefield, and Matthews & Co., Driffield.

Ammonia-Phosphate and Nitro-Phosphate.................per ton £8 0 0
Superphosphate of Lime .... ,, 7 0 0

Agricultural Chemical Works, Stowmarket, Suffolk.

Prentice's Cereal Manure for Corn Crops...................per ton £8 10 0
Prentice's Turnip Manure .... ,, 7 0 0
Prentice's Superphosphate of Lime .... ,, 6 10 0

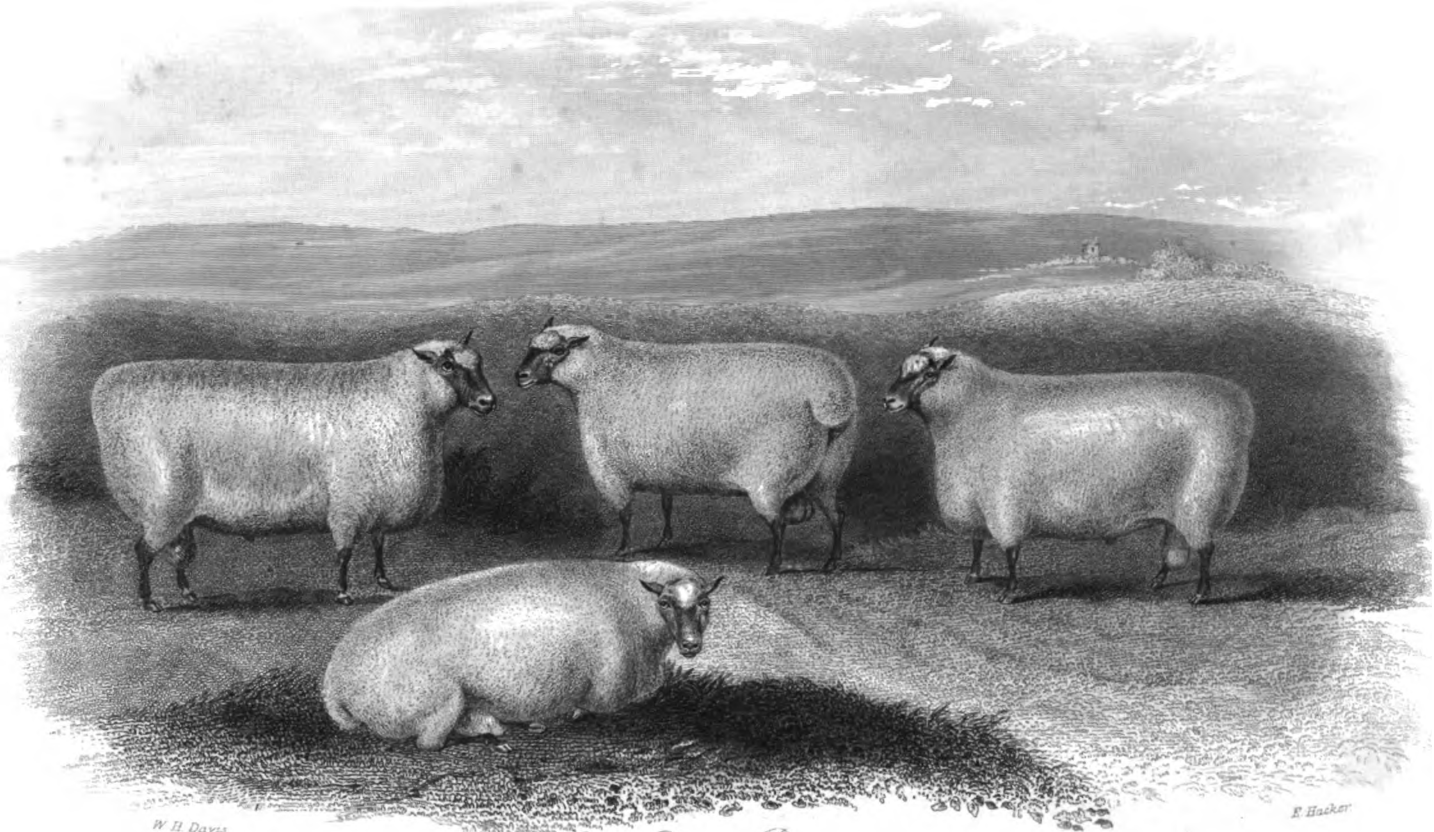
Lancashire Manure Company, Widnes, near Warrington.

J. Knight & Co.'s Nitrogenised Bone Manures..............per ton £8 15 0

Manure Works, Grovehill, Beverley.

Tigar & Co.'s Celebrated Turnip Manures...................per ton £7 10 0

Printed by Rogerson and Tuxford, 246, Strand, London.



W. H. Davis

E. Hacker

South-Down Rams.

The Property of Mr Jonas Webb of Babraham Cambridge; for all of which Prizes were awarded at the Salisbury Meeting of the R. A. S. of England July 1857.

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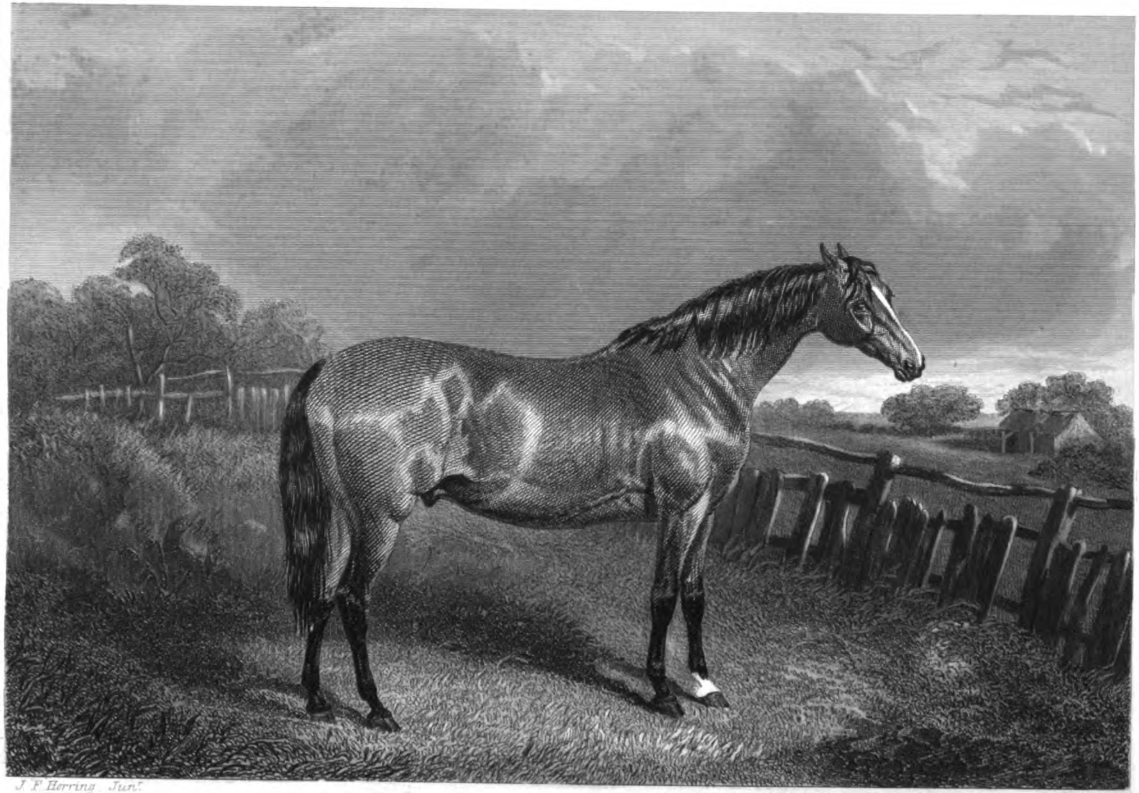


J. F. Herring Junr. E. Hacker

Hobbie Noble.

A Thorough-bred Stallion, the Property of Mr. [illegible] of [illegible] Hall, Scarborough, for which the First Prize of £[illegible] was awarded at the Salisbury Meeting of the R.A.S. of England 1857.

[illegible]

THE FARMER'S MAGAZINE.

MARCH, 1858.

PLATE I.

SOUTHDOWN RAMS,

THE PROPERTY OF MR. JONAS WEBB, OF BABRAHAM, CAMBRIDGE.

At the Salisbury Meeting of the Royal Agricultural Society Mr. Jonas Webb distinguished himself more than ever as a breeder of Southdown sheep. In the shearling ram class there were between sixty and seventy exhibited; and the Duke of Richmond, Mr. Rigden, Lord Walsingham, Mr. Overman, Mr. Ellman, Mr. Sainsbury, Mr. Farquharson, and Mr. Harding were amongst the competitors. From these the judges sorted out just half-a-dozen sheep. After much deliberation they gave two of these the prizes, they *specially* commended two more, and they *highly* commended the other two. The three couple were the property of Mr. Webb. In the aged rams he again stood first and second; with another highly commended.

The four rams in our plate are the four prize sheep. The one at the extreme right of the picture is the first prize old sheep, a two-year-old when shown at Salisbury. He was exhibited at Chelmsford the year previous, but not on that occasion noticed by the judges. He is a splendid specimen of the breed; fine and full in form, and noble in appearance. He begins with an exceedingly good head, and the colour of his face, to which he is much indebted, is just what Southdown breeders so much fancy. His neck is full and well set in to the head; shoulders and chine remarkably good and wide, with a tremendous chest and good plaits; his back very wide and full covered; ribs correctly springing, forming a capital rotund frame of great depth. His girth is nearly five feet, his loin and hips wide, but rump rather short, thighs not heavy, and legs a little too upright. His wool is all that can be desired, and plenty of it.—First prize of 25 sovs.

The second prize aged sheep is at the other extreme of the group. This ram is yet more famous. He was the first prize sheep at the Great International Exhibition in Paris, in 1856, and the second prize yearling at Chelmsford in the same year. Considerable discussion, it will be remembered, ensued as to the latter award; many contending he should have been first. He has all the good proportions of his companion, but with a somewhat darker face, a famous fore and hind quarter, a first-rate rump, with twist, thighs, and flank exceedingly good. There has seldom been a more complete specimen of the Southdown—so handsome, so widely proportioned, or so generally good.—Second prize, of 15 sovs.

The centre sheep of the three standing up is the first prize yearling ram. He is a very fine animal, and quite worthy of the distinction he obtained. He is of great size, exceedingly well proportioned throughout, and bids fair to make up into quite a first-class ram. His deep frame, wide chine and shoulders, everywhere well covered—his broad fat back and springing ribs, with capital flank and underpart, all denote this.—First prize, of 25 sovs.

The second, lying down, is scarcely inferior. He has a very correct frame, broad chine and shoulder, well covered, full rump, dark and wide full twist, and unusually good thigh.—Second prize, of 15 sovs.

Mr. Webb has used all these rams himself; while, as some further test of their merit, we may mention that many other of the Southdown breeders honestly admitted that they never sent out such good sheep as they did to Salisbury.

PLATE II.

HOBBIE NOBLE;

A THOROUGH-BRED STALLION, THE PROPERTY OF MR. THOMAS GROVES, OF PLOMPTON HALL, KNARESBOROUGH.

Hobbie Noble, bred by Lord John Scott, in 1849, is by Pantaloon, out of Phryne, by Touchstone, her dam Decoy, by Filho da Puta—Finesse, by Peruvian.

Pantaloon, by Castrel, out of Idalia, by Peruvian, was the sire of many good horses, including Satirist, a winner of the St. Leger, and Ghuznee, a winner of the Oaks.

Phryne, bred by Lord Westminster, in 1840, is also the dam of Elthiron, Windhound, Miserrima, and The Reiver, all by Pantaloon; of Rambling Katie, and Blanche of Middlebie, by Melbourne; and of Katherine Logie, by the Flying Dutchman. She has been from the first, and still continues, in Lord John Scott's stud.

Hobbie Noble was somewhat renowned as a race-horse. Indeed his two-year-old performances were so good as to make him first favourite for the Derby of his year, for which he ran as Mr. Merry's, having been purchased of Lord John Scott for the unheard-of-price of six thousand guineas. It is not, however, as a race-horse, but as "the best stallion to get hunters" that Hobbie Noble's portrait appears here. This distinction was awarded him at the Salisbury Meeting of the Royal Agricultural Society, when he took the first prize of 30 sovs. against Spencer (the second-prize horse), Theon, The Knight of Gwynne, Little Brownie, Lascelles, Clumsy, Master Robin, The Circassian, Flagellator, Stotforth, and others; the entry in all reaching to fifteen. Still, the award was all one way, and just as any horseman would have decided it—to the best known, best bred, and certainly best looking horse of the lot. Hobbie Noble is in colour a bright bay, with a great deal of power and style about him, a good neck and shoulder, capital deep barrel, strong quarters, but still rather light in the thighs. Taken altogether he is a remarkably fine animal, and a particularly well-topped horse, with a somewhat wicked head, and not, we fancy, to be trifled with. The family, in fact, are not famous for the best of tempers, and his own brother, The Reiver, was one of the most savage horses ever stripped.

Hobbie Noble's career on the turf closed in 1853, and he stood for the next two seasons at Willesden. More recently he has been transferred to the North by his present owner, Mr. Groves, who has always a good horse to show us at the Yorkshire Meetings. Another of his, the Knight ofGwynne, was also in the entry at Salisbury, and selected as the second-best at the unprecedented exhibition of thorough-bred stock at Waterford; while a third, a draught-horse called The Conqueror, an animal of amazing size and substance, took the extra premium at the great horse show at York, in the same month.

Hobbie Noble has been let for the ensuing season, to go to Ireland. None of his stock have yet appeared; but Mr. Groves himself has two or three coming on by him, and there should be something of his under weigh this spring.

WEEDS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

There are few practical inquiries more likely to repay the farmer than those which relate to weeds. Their habits; the vegetation of their seeds; their extirpation; their use, either unburned or their ashes, as manure—are all matters of the highest importance to the cultivator. These were questions which, in what are sometimes called—as if in derision—"the good old days of England," the farmers but little regarded. The custom was then—as, in fact, is yet the case in most newly or only partially-cultivated districts—for the landholder to run away, as it were, from enemies he was too ignorant or too indolent to successfully withstand. When, therefore, he found his neglected and exhausted arable land gradually becoming full of weeds, instead of attempting their extirpation by fallowing, or hoeing, or paring and burning, he took the easier course of abandoning the field for a considerable period to Nature's care. Thence soon came hosts of couch-grass, thistles, and the other denizens of extensively-exhausted arable soils. These speedily crowded together, and formed a mass of herbage which, by its copious growth, ripening, and decay, formed in the soil a collection of organic matters, on which better and more daintily-feeding plants were gradually (after seasons had elapsed) enabled to subsist. And then, after a series of years had brought about this state of things, the farmer was wont to again bring his long-neglected field into cultivation.

It is true that the more enlightened, of those days, denounced this indolent neglect of weeds. Landlords suggested improvements: even the Legislature interfered, evidently, however, with little success. The late Sir John Sinclair has given some amusing instances of such enactments. It seems that, by an old French law, a farmer might sue his neighbour who, at the proper seasons, neglected to destroy the thistles on his land; or he might employ persons to extirpate them, at the grower's expense. In Denmark, there is a law which is directed to the extirpation of the corn-marigold (*Chrysanthemum segetum*); and in Scotland, so far back as the year 1220, a statute of Alexander II. provides for the punishment of those farmers who allowed their land to become foul. Like most of the old statutes of Scotland, the law contains but few unnecessary words. It merely declares that man to be a traitor, "who poisons the King's lands with weeds," and thus introduces into them a host of enemies. It seems that tenants who had the corn-marigold plant in their corn were fined a sheep for each stalk; and that, under the authority of the law to which we have been referring, a Scotch baron—Sir William Grierson—was accustomed to hold *Goul* Courts, at which all those persons were liable to be fined, on whose land more than three heads of that weed were discovered.

It is refreshing to turn from times when such laws were deemed to be desirable, to days when, as at present, the extirpation of weeds is eagerly sought, and a constant and successful war waged against them, without the aid of Parliament.

The labours of modern farmers, aided by the "extirpators," "scarifiers," and other invaluable implements, have accomplished great things in this war of extermination; but we all feel that still greater advances are yet to be made. Science has of late done good service in the cause. The men who grace the staff of the Agricultural College of Cirencester have well led the way, of late, in the investigation. Professor Buckman has traced their habits, and some of the effects of different modes of cultivation on the growth of the weeds of different soils; and, still more recently, Professor Voelcker (*Journal Roy. Ag. Soc.*, vol. xviii., p. 350) has given, amongst other valuable matters relating to the subject of this paper, the analysis of two of the more common weeds of the cereal soils—the stemless thistle and the couch. His results will be read with deep interest by many of my readers, who, as I described in this magazine for last month, are in many places now collecting their weeds into heaps, and reducing them to an enriching compost by copious additions of common salt or lime.

Professor Voelcker tells us that he selected these two weeds for examination, since they so very generally infest the calcareous clay soils and brashy lands of the Cotswold Hills; but many a farmer, who will read the result of his inquiries far away from the oolite formation, is equally haunted by these unwelcome visitors.

The stemless thistle (*Carduus acaulis*), when examined as just gathered, contained from 25 to 26 per cent. of dry substance, and 74 to 75 per cent. of water. When burnt, the plant yielded 9.66 per cent. of ash. In 100 parts of this ash (and this is the important portion of the inquiry) was found:

Potash and chloride of potassium	27·40
Common salt	·90
Lime	41·44
Magnesia	4·40
Oxide of iron and alumina	2·01
Phosphoric acid	5·36
Sulphuric acid	2·92
Soluble silica and sand	3·50
Carbonic acid, and loss	12.07

The large proportion of lime which this ash contains, the Professor considers, may account for the fact that this thistle delights in the calcareous formation of Gloucestershire. The amount of phosphoric acid which it yields is by no means inconsiderable; and this is evidently united with lime, as phosphate of lime.

Of still more general interest to the farmer is the analysis of the widely-diffused couch-grass, which ever seems to haunt arable soils, and to follow, as it were, the wheels of the plough. The couch examined in the laboratory at Cirencester, on being burnt, furnished an ash coloured slightly red by oxide of iron, derived, no doubt, from the adhering clay. These were found by Mr. Kensington to contain, per cent.:

Potash	10·02
Soda	5·69
Common salt	3·34
Lime	5·58
Magnesia	·04
Oxides of iron and alumina	12·40
Phosphoric acid	9·38
Sulphuric acid	5·33
Soluble silica	24·92
Insoluble silicious matter (chiefly sand)	17·50
Carbonic acid, and loss	5·80

These constituents, the Professor considers, are probably united in the couch-ash as follows:—

	Per Cent.
Carbonate of potash	14·10
Potash in a state of silicate	0·27
Soda in a state of silicate	5·69
Common salt	3·34
Oxides of iron and alumina	12·40
United with phosphoric acid (equal to bone-earth 20·32)	9·38
Sulphate of lime	9·06
Carbonate of lime	3·30
Magnesia in a state of silicate	0·04
Soluble silica	24·92
Insoluble silicious sand	17·50

The ash of the couch, adds Mr. Voelcker, it will be seen, differs in several respects from that of the stemless thistle: the latter contained but little silica, whilst soluble silica is the chief constituent of couch. Again, the proportions of lime and potash in the thistle are much larger than in couch; an interesting fact, on account of both weeds having been collected from soils of a similar character. This is quite consistent with our present information on the particular wants of different families of plants. Thistles are evidently lime and potash plants; and couch appears to require much soluble silica for its growth, a fact which perhaps will explain its occurrence in sandy, as well as in calcareous and clay soils. The two last-mentioned soils often, it is true, do not contain any silica, in the shape of sand, capable of being mechanically separated from the constituents of other soils; but most clay soils are rich in alkaline silicates, from which plants unquestionably can take up soluble silica much more readily than from sand.

The large proportion of phosphoric acid in couch-grass, as the Professor adds, likewise deserves to be specially noticed. United with lime, we have no less than 20 per cent. of bone-earth in couch-ash; a circumstance which throws some light on the experience of many Gloucestershire farmers, who observe, That the fouler the land is, the better will be the crop of turnips, grown without any other manure than the ashes produced by paring and burning the land. "I remember," observes the Professor, "having once walked over a very foul piece of land full of couch, and was not a little amused by the remark of my agricultural friend who accompanied me, 'What fine healthy couch, sir! It will give me next year, I don't doubt, a splendid crop of roots, although I do not mean to put a single load of manure on this land.' Indeed," concludes the Professor, "I have ascertained that a much larger proportion of bone-earth is brought within reach of the turnip plant, in the red ashes obtained on paring and burning, than is contained in a heavy dressing of bone-dust."

These practical observations of the heavy-soil-farmer, as to the fertilizing effects of a good crop of couch-grass, I rather incline to the opinion, are well worthy of far more extended investigation than they have yet received.

The observation, that where there is a good crop of couch, that there a good crop of turnips may be produced, may, it is true, merely mean the same thing as the well-known almost universal agricultural remark, that where the soil is in a condition to produce luxuriant weeds, that there other and better plants may be made to grow with equal success. It probably may mean merely this: but this well-known fact may be capable of other explanations. Does the couch plant only *collect* together the phosphate of lime already existing in the soil? Would a portion of a field kept fallow and *perfectly free* from weeds for a given period, produce as good a crop of turnips as another portion of the same field in which the couch was allowed to grow, and was then collected, reduced to ashes, and the ashes spread over the soil, thus also well cleansed for the root crop? It is probable that by either mode of preparing the soil about the same results would be obtained; but it might happen that the couch plant would be found to collect the phosphate of lime with more energy or from greater depths than in the case of the ordinary cultivated plants. I opine that we shall hereafter have our knowledge of the source whence plants derive their food considerably modified and extended.

The valuable paper of Professor Voelcker, to which I have been thus alluding, is chiefly directed to the elucidation of the old farming process of paring and burning—a practice which certainly needs a much clearer chemical explanation than it has yet received. It is an operation but ill-adapted to light soils; while on many clays the application of fire is not only attended with benefit to foul and long-neglected soils, but is, in some considerable districts, repeated over and over again, at but moderate intervals of time, with almost continued advantage.

In this research, the labours of the eminent chemist, whose researches I have been tracing, are important, and will probably tend to the extension, on suitable soils, of paring and burning. Some of the conclusions to which he arrives, it is true, may hardly be admitted as decisive; but, after these drawbacks, I would commend his report to the farmer's careful study. He concludes that by paring and burning, 1st, The inert vegetable matter of the soil is made to yield valuable mineral food for plants; 2nd, That the mechanical condition of the soil is improved; 3rd, That the process is not advantageous for light soils.

The cautious way, however, in which the Professor addresses himself to the subject, is well worthy of the farmer's careful imitation. The soils for which that antiquated process is most desirable, are certainly not very numerous; and it is perhaps more than probable that the further our knowledge of weeds and soils is increased, the less occasion shall we find for the employment of paring and burning.

THE STEAM PLOUGH.

Mr. J. Algernon Clarke read a paper under this title, at the customary weekly meeting of the Society of Arts on Wednesday, February 10th, W. Fairbairn, Esq., in the chair. Mr. Clarke's Essay was written and forwarded early in 1857, in answer to an invitation from the Council for an article on such a subject The medal of the Society was subsequently awarded its author; but he was not called upon to read it until something like a year after it was composed. There were very few practical agriculturists present, but nearly all those gentlemen now directly interested in the further development of steam-power to such a purpose. These included Messrs. J. Allen Ransome, John Fowler, Smith, of Woolston, J. Howard, of Bedford, Boydell, Romaine, and Halkett. There were also present Messrs. J. J. Mechi, W. Fisher Hobbs, W. Bullock Webster, J. C. Morton, H. Corbet, Bethell, and T. Scott. Mr. Clarke proceeded as follows:—

Steam-power having been successfully applied to what may be called the mill-work of the farm, such as thrashing, cutting, slicing, grinding, pulping, and preparing the various products and "feeding stuffs," entering into the economy of the farmyard, I take the present subject to be confined to operations in the field; including drainage, preparatory tillage of all kinds, sowing, weeding, reaping, cartage of produce to suitable storing places, and the distribution of manure. And, lest a paper on these topics should extend to an unmanageable length, it will be advisable to be still more restricted, so that, waiving for the present a consideration of draining, manuring, sowing, and the light after-processes of tillage, I come to the first operation of breaking up the soil, and the mechanical preparation of a seed-bed, as the main objects to be accomplished in steam cultivation.

Mr. Hoskyns, whose original views of this subject have moulded the designs of many inventors, and first fully awakened the agricultural world to the importance of steam-culture, teaches us to look beyond our familiar digging, ploughing, harrowing, scuffling, and rolling, as the sole possible modes in which the new motive-power may operate. We should analyze these processes; see what is the end attained by them, and then endeavour to accomplish the desired result with a machine as specially adapted to steam-power, as the present horse and hand implements are to animal-power. Investigating the nature of preparatory tillage, he finds it to consist in "comminution, aëration, and inversion," which it is possible to effect at once, in a single act, and with a simply-formed tilling instrument; and from the fact of horse-traction being horizontal, manual delving vertical, and the "favourite motion" of machine-work circular, he concludes (with an amount of argument and illustration which establishes and fortifies his deductions) that some kind of "revolving cultivator" will ultimately be found best for being driven by a steam-engine. Accordingly, I am prepared to offer what, I believe, to be a new principle of rotary digging by steam-power, calculated to fulfil the various conditions recommended by theory or demanded by practice; but as an essay solely on mechanical tillage, so far advanced and a-head of the times, would be of little more immediate practical value than a history of past attempts and failure, I will first consider the application of steam-power to our existing order of implements.

In the outset let me remark that, although the "favourite motion" of steam machinery is cicular, this is no valid reason why we should reject without trial every other kind of motion if suited to our purpose, seeing that the steam-engine employs rectilinear motion, continuous and reciprocating, and, indeed, all conceivable varieties of movement adapted to specific ends; and of all practical trials yet made, with the exception, perhaps, of Mr. Romaine's cultivator, far more favourable results have followed from applying steam-power to the haulage of traction implements, than from setting it to drive revolving cultivators. The wonderful rapidity with which steam-thrashing has been accomplished, is owing to the circumstances that there was really nothing new to do; the engine had to turn a sheave (to thrash a sheaf) by means of a driving belt, just as it was accustomed to do in thousands of factories, only it had to be made portable. But working over so great an area as the surface of a field is a novel operation for the steam-engine, beyond the mere application of cog-wheels, shafting, belts, and brasses; and there is difficulty enough in finding how to apply the motive-power at all points of the surface in succession without staying to devise, in addition, more perfect tillage implements than we now possess.

To draw an implement such as the plough, which has been tested, improved, and adapted throughout many centuries, is a simpler and readier problem, than to contrive a new description of tool for performing a hitherto unknown operation, involving, perhaps, a novel system of cultivation altogether; and as in thrashing, the implement will doubtless be speedily improved when once the new power has been applied to it. Again, there is no doubt that intelligent farmers everywhere are prepared to work traction implements by steam, whenever they are convinced that the present ploughing, scarifying, &c., can be done at less cost, all things considered, than by horses. A steam-plough is capable of instant and universal adoption, while a new tilling machine would not only meet with mechanical difficulties, but be a long time in achieving practical and pecuniary success against customs and prejudices cherished for generations. It will be wise to imitate those processes which are now found to produce the best effects, even though this may not be making the most advantage of the power that is possible.

In practice it is found indispensable that the staple of the land should be occasionally inverted—to bury surface weeds, stubble, sward, or manure, and bring up root weeds for extraction; also to fertilize the soil by the chemical and mechanical effects which follow both the exposure of earth that has lain long buried, and the burial of that which has been long treated by rains, dews, winds, frosts, and sunshine. This inverting, indeed, may be said to constitute the heaviest labour of tillage; if we can perform this, we can readily master any after-stirring of pulverization. Breaking-up, without inversion, is getting into favour; but experience at Lois-Weedon and elsewhere shows that a tenacious subsoil should be exposed and weathered before being mingled with the staple. Mere granulation by scratching or rasping, mingling rather than turning over the mass so comminuted, has been proposed as the ideal operation we should aim to accomplish; but, however useful it may prove in some cases, I cannot regard it as calculated to meet all the necessities of our present practice, in which we find that, after certain crops and for various purposes, the soil must be cut or broken into pieces sufficiently large and tenacious to be turned bodily upside down. The pick or mattock may be a valuable tool in some countries—working with a minutely pulverizing effect, and, at the same time, securing a more or less complete inversion—and the plough itself is in some climates a mere grubbing or ribbing tool; but with our moist soils and weeping atmosphere, our principal implements for performing the fundamental process of cultivation have been of necessity the plough that turns a furrow-slice, and the spade that cuts and completely turns over a spit, the plough modified into many shapes, and the spade or fork made equally versatile in its adaptation to deep, shallow, light, strong, or stony land. Of these two implements the plough can be more easily actuated by steam-power than the spade: all hand tools being worked by several different motions intermittent and irregular, and so requiring complicated mechanism to imitate their action, while traction implements, moving with a continuous rectilinear motion, have simply to be drawn along, and with but little modification needful in their present form; hence, the solution of the steam-culture problem lying nearest to us consists in

Steam Ploughing.

On light land, and where shallow work alone is required, the breaking up and inversion of the soil is done with great efficiency by the plough; and when we see the neatness with which leas are "tucked down" by our first-class skim-coultered ploughs, precisely that toughness being left in the slice which is so desirable on such land, we cannot think that any better implement need be there desired. On heavy land, where tillage makes a larger item in the expenses of management, and a cheaper motive power than that of horses will prove the greatest boon, the plough seems to be used merely because the horses cannot dig. The sledging sole does harm: the slices, not sufficiently subdivided, harden, and make work for future dragging and reducing; and inversion is imperfectly effected, because a "harrow-edge" is necessary for securing a good "mould." Deep culture is also needed on most strong lands; yet the farther we dig below the surface, the more is our horizontal traction at a disadvantage. A vertically-descending tool appears to be required, rather than a horizontally-drawn one; and, perhaps, rotary diggers will utimately be found as peculiarly adapted for penetrating and stirring up the subsoil from great depths, as traction implements are for tilling the upper stratum. Such lands will be grateful for a digging or trenching machine driven (not dragged) by a steam engine, whenever it is practically brought to the field. Meanwhile, the most effective implement for deep work on a large scale, in which manual digging is precluded, is the plough, with the subsoiler or trench-plough following. However, in spite of Lois Weedon husbandry, and the larger experience of the Yester farms, deep tillage is not so much sought after at present as a more rapid and economical method of performing ordinary ploughing. Instead of the slow trenching machine (although necessary to the renovation of clay-land farming), everybody is asking for steam machinery that can plough or equally well cultivate, at comparatively small cost, a great area of ground in a little time.

Steam ploughing is not only possible, but is being actually done on a considerable scale; and, without reciting the long history of inventions for the purpose, I wish to consider the various plans now before the public—the results, as far as yet ascertained—and then to make suggestions for further progress.

The first point is, How to apply the power to the implement; and the next is, The construction of the plough or ploughing machine.

As the material to be cut and turned over cannot be "fed" to our machine, we must take the machine over every part of the surface to be acted upon. Is the motive power, then, to be transported bodily over the whole area, as horses are? or is it to be transmitted from a distance? The idea of a locomotive power was the earliest, and certainly the most natural, from observing horse-labour, besides being a corollary from the invention of steam-carriages. And, though it may at first sight seem ridiculous to harness an engine to an implement, as though its strength, like that of a horse, lay in its legs, yet we have the example of the railway locomotive, which exerts all its power by means of its (rotary) legs, yokes itself in front of a carriage, and pulls with traces, as a horse does. Working on a level and smooth roadway, the locomotive can drag a train of carriages more economically than a stationary engine can haul it with rope; and, allowing for the difference between a galloping railway speed and the sluggish pace required on an arable field, analogy would lead us to expect a like superiority of the locomotive, whether in pulling ploughs or vehicles. I need not enumerate all the attempts at locomotive engines for traversing arable land, but shall notice two only — one "theoretical," the other practical.

The great weight of a steam-engine, with its water and coal, forms the chief obstacle to its transit over a soft or rugged surface; why not, therefore, employ a pneumatic locomotive? In 1839, Mr. Henry Pinkus patented a most ingenious method of applying an atmospheric vacuum, or else compressed air, as an auxiliary for conveying motive-power from a stationary engine to travelling implements. Now, without adopting his proposal of laying down air main-pipes about an estate, and distributing power (as Mr. Mechi does manure) from steam-pumps at the central homestead, might we not take his plan for connecting a light travelling pneumatic engine with air-pumps attached to a stationary portable steam-engine? A flexible tube, coiled on a cage-drum upon the pneumatic locomotive, is paid out as the locomotive recedes from the steam-engine, and wound up as it approaches. By passing and repassing the steam-engine, a length of 200 yards may be ploughed with only half that length of pipe; and as this is merely laid down and rolled up again, very little wear from friction is incurred.

All doubt as to the effectiveness of pneumatic power applied in this way may now be considered as dispelled by the success of a compressed air-engine at Govan colliery, near Glasgow, which has been working for more than six years, without requiring any repairs or adjustment. The air-engine is situated half-a-mile from the steam-engine and compressing-pump; yet, as the pipe conveying the air is of large diameter, viz., 10 inches, the pressure of the air is diminished only 1lb. per square inch in passing through it. However, there is so much nicety and complication necessary in the compressing machinery, and in the apparatus for neutralizing the great development of heat occasioned by the process of obtaining air at only 20lbs. pressure to the inch, that I think the principle must be abandoned, and we must give up, at any rate for a long time, the advantage of possessing such an extremely light as well as powerful locomotive power in our fields.

For making the steam-engine itself an agricultural locomotive, we have Mr. Boydell's "endless railway engine." I need not describe in detail this admirable working-out of an old idea. By bridging over hollows and forming inclined planes over obstacles; by stepping, as it were, instead of rolling, and laying down smooth even iron rails on which the wheels run; and still further, by bearing with flat platforms instead of curved wheel-tires upon soft ground, the shoes or rail-pieces marvellously ease the progress of a ponderous machine. And thus the "traction-engine" can climb considerable gradients, as proved at the Salisbury Agricultural Meeting; and whether we adopt the particular form of engine there exhibited, or Mr. Burrell's appliance of the rails to common portable engines, or Messrs. Tuxford's compact and manageable engine on three wheels, in which both the main travelling-wheels are driven, whether turning a curve or proceeding in a straight line, or Mr. Collinson Hall's enormously high-pressure locomotive, with its peculiarly-shaped boiler and steam-chamber maintaining the water-levels always above the tubes, it is now clear that the farmer's engine may be independent of his horses, that it can draw from farm to farm the heavy thrashing-machine it works, and pull home the harvest-sheaves or lead out those loads of farm-manure which now tax the power of our teams so many weeks in the year. From the many experiments made and published, it is certain that the "steam-horse" can drag implements on moderately level land at a very expeditious and cheap rate, which is not surprising when we consider that the engine brings the implements, and the coal and water enough for the day's use, into the field with it; that no tackle has to be laid out and fixed, or taken up and shifted; that the amount of manual labour required is very small, and the time lost in turning and removing comparatively trifling.

How long a traction engine will last in constant field use I am unable to say; but everybody knows how the rough journeys of common portable engines tend to damage and deteriorate them; and though the rails prevent much of the shock and strain which would be otherwise felt, continual travelling over a hard and rugged surface like arable land must have an injurious effect upon a ponderous boiler and machinery. The wear of the rails is also a very serious item. The objection that the great weight is calculated to injure a strong soil by undue consolidation, applies to the traction engine as well as to horses, but not with greater force. For an engine of 8 or 10 tons traversing a field weighs but little more than the number of horses requisite to pull the same implements; and their feet penetrate and injure the ground more deeply than the broad platform rails.

It appears that a momentary emergence of the tubes above the water level in the boiler is not dangerous; but for maintaining a nearly horizontal position upon long inclines, might not ordinary boilers be supported about the middle of their length, and raised or lowered at one end by means of an adjusting screw?

I am very hopeful of the extensive adoption of the traction engine upon very level land, for ploughing or scarifying whole ground; but fear it would be impracticable for working land already ploughed, so much of the motive-power being wasted in carrying itself over rough and yielding furrows or large clods.

It is to be regretted that the adaptation of the ploughs to the traction engine has hitherto been so unfortunate as to prevent the accomplishment of a high quality of work. Mr. Smith, of Woolston, has just patented an improvement in the yoking of the implements.

Before quitting the subject of locomotive engines for traction, I ought to mention Mr. Halkett's recently-proposed system of "guideways," or rails laid 50 feet apart over the entire surface of the land, for the conveyance of the engine and tilling machinery. The advantages promised on clay soils are prodigious, but I believe not the less reasonable and likely to be realized; and I would dwell longer upon the mechanical merits and economy of the plan, did I not believe that the first outlay, of £25 to £30 an acre, effectually debars its employment to the tenant farmer, while there are but few estates, I suppose, on which landowners are likely to apply it, or on which a public company might obtain power to operate. And I prefer to notice schemes of steam culture for tilling our fields as at present laid out, as more immediately practicable and available than those requiring the complete remodelling of estates.

For ploughing, and scarifying, &c., in a hilly country, we must have recourse to the windlass and rope as the best means of transmitting power from the engine to the implement; and it is a question whether this or the traction engine principle is best even for level districts, Of several plans which have come before the public for working implements by a stationary engine and windlass, only one now survives. Mr. Fowler, having tried one method which wasted too much time in shifting the anchorages, and another which, though with these self-shifting, required a great length of rope, has adopted the system of moving both engine and windlass along the headland. Mr. Smith, of Woolston, adheres to the stationary engine and windlass; for though it involves the use and wear of wire-rope laid all round the field instead of once up and down it, and loss of power also in passing the rope round four anchored pulleys instead of only one, it enables him to employ a very compact form of winding-machine or capstan, and relieves him of the difficulty of moving the heavy machinery along the headland. The anchors at both ends of the work are removed at intervals into holes dug for them by hand labour, and a man is necessary to guide the rope into proper coils on the drums; so that with the engine-man, and a man and boy with the implement, five men and a boy are engaged in working the machinery, beside the horse and hands fetching water. The working cost of deeply breaking-up the soil, at 5 acres a day, including the shifting of the tackle, is 5s. 2d.; and of trenching and subsoiling (3 acres a day) 8s. 8d. per acre; the wear and tear being taken at 1s. 6d. per acre more. The price of the tackle and implement adapted to a common portable seven-horse engine is £220; and the experience of several farmers seems to show that it is worth while to lay out this sum, and then expend the above amount per acre for autumn cleaning and other preparations, even though ploughing itself may be left for horse-labour.

Mr. Smith's method of turning the implement at the end of its course, by simply having it yoked to the ropes by a "turn-bow" or hook in front, is the simplest and readiest possible. I shall refer to his system of tillage by-and-bye; ordinary "ploughing" not being included in it.

But may not this hauling by wire-rope with a stationary engine be pushed too far? When a very great length of running rope is out, the friction of the slack portions of the rope on the ground (the tight parts resting on friction-rollers), that of the pulleys or snatch-blocks on their bearings, the bending of the rope round the pulleys, and other conditions, consume a very considerable amount of power, besides occasioning a large amount of wear; and our object should, therefore, be to place the engine as near its work as may be consistent with no undue loss of time in shifting anchorages and turning the implement at the ends. This was the principle acted upon in the earliest practical trials of steam-ploughing, a medium between the travelling and fixed motive-power being chosen, by arranging the engine with its winding mechanism upon the head-land, and shifting it so as to be always opposite the ploughing. If we have two engines with coiling-drums, one at each end of the field, and two implements moving in opposite directions, the ploughs will be at the least possible average distance from the motive-power. However, the very great prime cost, the cumbersomeness and difficulty of moving so much heavy machinery from field to field, the time lost in adjusting the two implements at the end of their work, and other considerations, are unfavourable to the scheme, except when ploughing is undertaken on a scale of great magnitude, and the engines are constructed so as to be perfectly capable of steaming their own way from farm to farm. A better plan (indeed, the first ever brought into actual operation) is to employ one engine and winding-gear on one head-land, and an anchorage and pulley on the other, both being shifted along as the work proceeds, and a single frame of ploughs being hauled up to the engine or pulley alternately. This is the plan adopted by Mr. Fowler; and, for comparing the saving of power effected, suppose a plot to be ploughed is 200 yards square, with a stationary engine and windlass the average length of rope running at once would be 600 yards, and the average distance of the implement from the windlass 300 yards; with a shifting engine and windlass, the average length of rope out is 400 yards, and the average distance of the implement 200—that is, one-third less. There is a further economy of power in having a direct pull upon the plough with one rope, and round only one pulley with the other, instead of round two pulleys with both ropes, as in the stationary windlass method. There is, therefore, no doubt that Mr. Fowler could haul Mr. Smith's implements with greater results than have yet been attained by the latter gentleman's rectangular method of working the rope; so that it is the simplicity and lightness of machinery and apparatus, rather than economy in working expense, which form the favourable points of the Woolston system. One advantage of Mr. Fowler's plan is also that an unlimited extent of land may be ploughed with the same length of rope, fewer removals of the engine and tackle by men and horses being therefore required. I need not describe his ingenious anchorage, which propels itself onward, with its cutting disc-wheels always in the soil, forming a perpetual holdfast or purchase, or the well-known engine with coiling-drums underneath, which also slowly creeps forward along the headland. A portable engine, by its inherent weight, forms such a capital fulcrum or resistance against the strain of the hauling-rope, that it was well to use it as such; but until we have the combined engine and windlass able to transport itself up-hill and along ordinary farm roads, I must view it as too ponderous and unwieldy for common farm use. One material point should be considered, namely, that to be immediately useful and successful, and patronized by the farmers generally, a steam-plough ought to be adapted to our present portable thrashing engines, now distributed by perhaps ten thousands throughout the kingdom. Mr. Williams, of Baydon, connects a windlass on wheels with a portable engine by means of a strong framing; and though he has not been able, I believe, to work his ploughs without horses assisting, this portion of his plan is on precisely the principle I regard as most feasible, and likely to meet with general favour. Mr. Fowler has adopted a similar method of enabling the farmer to avail himself of the engine he already possesses—the windlass-frame, mounted on large wheels, being so constructed as to embrace an ordinary engine like a pair of shafts, one end of the boiler being supported on this frame, and the other remaining upon its own travelling wheels. It does not take much time to unite or separate the engine or windlass; when joined, they propel themselves forward on the head-land as one machine, and when separated, three horses can take either part from place to place.

At the trial at Stirling, Mr. Fowler's machinery, manufactured by Messrs. Ransomes and Sims, ploughed heavy land 5½ inches deep, at the rate of 6¾ acres a-day, for a total estimated cost of about 8s. per acre, which by horse-labour would have been 15s. per acre. On milder soil, 7 inches deep, at the rate of 9½ acres a-day, for about 6s. per acre, which by horses would have been 8s. per acre; and the trenching implement going 12½ inches deep, ploughed at the rate of 5 acres a-day, at say 11s. per acre, work which would need 6 horses for accomplishing only one acre in a day. The saving in the cost of ploughing we may reckon 35 per cent. on the loamy land, 40 per cent. on the heavy land, and say 60 per cent. in trenching; and it is here observable that the economical advantage of steam over horse-power is in proportion to the difficulty of the operation, whether arising from the stubbornness of the ground, or the depth of the tillage. The superior quality of the work, and the great benefit of turning over the furrow-slices with a rapid motion, and with no damaging pressure either by the plough-soles or by horses' hoofs, were points equally well demonstrated on that as on many other occasions.

The adoption of a shifting engine and windlass, I view as one of the best steps taken for cheapening the operation of steam-ploughing, a step that economizes power, saves time, curtails labour, diminishes wear and tear, and lessens the first cost of machinery and tackle. For working scarifiers and other implements taking a great breadth at once, perhaps it would be well to employ Mr. Smith's removable anchors, instead of the self-shifting one.

Mr. Fowler's latest advance has been to triumph over one of the defects hitherto found in the coiling of the ropes upon the drums. He has dispensed with the man for regulating the winding on, and escaped the wear caused by the grinding and sawing action of the coils of rope upon each other, by giving up winding altogether, and leading the rope round grooves in the drums. He is thus enabled also to keep every portion of the rope sufficiently tight to be held off the ground by the friction-roller barrows, so that the wear is amazingly reduced. The total length of rope is also lessened by one-third, and is now less than half that required for a field of given size by the rectangular method. Only 800 yards of rope are required for ploughing 400 yards' length of furrow, and the price of the entire apparatus for a seven-horse engine is £280. The hands required are only two men and three boys, beside the water-carters. I should also add here, that scarifier tines have been adapted to the plough frame, so that either ploughing or grubbing can be effected by the same implement; and, of course, any traction implement whatever, as, for instance, Mr. Smith's subsoilers or scarifiers, may be worked by the same tackle.

There are many districts in which the fields are generally too precipitous for the easy passage of an ordinary engine from side to side, much less to admit of a locomotive traction engine climbing over all parts of the surface. In such cases we must fall back upon the stationary engine; and we may adopt the direct hauling from a fixed capstan, ropes laid out in a rectangular form, and anchorages self-shifting like Mr. Fowler's, or removed by hand in Mr. Smith's manner, or we may save the wear of wire-rope, and secure a light apparatus, by employing the travelling windlass of the Messrs. Fisken. In this arrangement the wire-rope is fixed, being fastened to self-shifting anchorages at the ends of the work, and the windlass, with implements attached, winds itself along the rope from end to end, motion being communicated from the engine in one corner of the field to the rigger, gear work, and coiling drums on the windlass, by an endless hemp cord mounted upon frames with friction rollers, while, in order that this cord may be very light, it is driven at a high velocity. There are many advantageous points in this invention—the complete control which one man has over the windlass and implements, so as to stop or return at pleasure without signalling of any kind, and the facility with which the tackle can be removed from place to place, being among the number; and it is to be much regretted that we no longer find it in a practical form before the public.

The hemp rope (manufactured so as to be impervious to wet) is so convenient for transmitting power, and I believe not liable to the rapid wearing out that we might suppose, that I will now offer a suggestion for its application in steep districts, where a shifting engine may be inadmissible; and here I would observe, that this paper is intended to be suggestive of mechanical improvements rather than a narrative of the achievements and performances of particular inventions. I believe that ideas are wanted, and beg to submit for your consideration a number of proposals with the diffidence becoming one who propounds methods deduced from theoretical considerations, from observations of the schemes of others tried on a great scale, and from mere working model and garden experiments of his own.

Suppose a windlass mounted on wheels not to travel up and down the field, but simply to shift itself along the headland as required, and hauling an implement by wire-ropes and an anchorage, as in Mr. Fowler's plan: Let there be cutting discs (like those in Mr. Fowler's anchorage), to prevent the windlass from slipping sideways, and let an endless hemp-rope transmit motion to a large grooved rigger on the windlass from a similar one on the engine at one corner of the field. I think a windlass with drums on a horizontal axis would be most compact and simple, and in order to permit of ploughing at various angles to the direction of the headland, the travelling wheels of the windlass frame might be capable of being more or less locked, so that it could advance as it were in an angular or diagonal direction, while the axes of the winding drums still remained at right angles to the line of ploughing. Mr. Fowler's grooved barrels would, however, be still better.

In re-modelling and modernizing this essay, which was written a year ago, I am gratified to find that one of my principal suggestions has now been superseded by Mr. Fowler's simple method of temporarily uniting portable windlasses with an ordinary engine. I will merely state briefly that my proposal was to connect such a shifting and independent windlass as that just described with a portable engine, by means of a beam or bar fastened to the windlass-frame at one end, and to the axle-trees of the engine at the other, provision being made for slightly locking the front wheels of the engine when required for steering. This beam was to be in two parts, with a right and left hand screw for altering its length, so as to regulate the distance of the engine from the windlass, and maintain the proper tension of the driving belt or rope. And the engine might be either shod with the "endless rails," or, more clumsily, travel upon a couple of short planks, laid down before and taken up behind it by hand labour, as in Lord Willoughby d'Eresby's plan.

I will now ask whether we may not relieve the anchorage of most of the present strain, and so have it of the lightest and simplest form, employ much less heavy rope, avoid the delays and hazards of "signalling," and save time at the ends by making the whole operation more automatic than at present. Suppose we give up the to-and-fro work with a single implement, and use two implements, ploughing always one way, namely, up to the windlass, one implement going backward empty while the other is in work. That part of the rope passing round the anchored pulley having only the draught of an implement out of work, and one length of slack rope to haul, may be very light indeed, and the anchorage correspondingly light and portable. No time would be lost in directing the implement into a fresh course, as each implement is steered as it travels backward precisely into the position from which it has to start. Directly one implement arrives at the windlass the other is ready to commence its journey, and perhaps the implement might itself "reverse" the winding drums by coming in contact with a lever connected with the clutches for this purpose, so that the change of motion might be almost instantaneous, and the ploughing perpetual and continuous. When it is considered that we now lose an hour or an hour and a-half in a day in changing, &c., at the ends of the work, the advantage of this plan is obvious. It is most applicable to ploughing in "lands" or "stetches," the track of one implement always the breadth of one bout from that of the other (as will be presently adverted to); but for flat work, in which the furrows are all thrown one way, crossing of the ropes would occur. This, however, merely requires the slack rope to be lifted over the plough in work, and the plough returning empty to cross over the tight rope. For accommodating the length of the small rope passing round the pulley to the varying lengths of the furrow in different parts of a field, it must be shortened or let out from time to time by means of a few reserve coils carried upon the ploughs. It would be an improvement upon the present mode of hooking the draught ropes to the implement if a "clip" were made use of, which could be instantly released by the ploughman; or if the ropes wrapped round a small barrel, held from rotating by a catch, and allowed to revolve when the pull or draught may be required to be stopped, in consequence of a stone, root, or other obstacle suddenly arresting the progress of the plough.

I now come to the second point—the construction of the plough or ploughing machine. And in the outset I would observe that we require a ploughing *machine*, and not merely a means of yoking separate ploughs held by men as before. When there no longer remain any animals to drive, and we have a steady, uniform, unflagging draught-power, why are we to retain the workman in a mechanical employment, and thus perpetuate our dependence upon his unskilfulness, carelessness, or fatigue? When once relieved from the co-operation of horses, having voluntary movements and wills of their own, ploughing becomes a strictly mechanical operation. The attention and directing judgment of the ploughman are no longer necessary to overrule the animal power, and accommodate the implement to its movements; and therefore I regard as incongruous and objectionable all projects for steam culture with ordinary horse-ploughs held by hand. They are also expensive in labour, requiring more workmen than a ploughing machine does for the same number of furrows; and they are awkward, owing to the difficulty of conducting a succession of ploughs close up to the headland, and turning or shifting them for the return course. Contrivances for meeting this difficulty I cannot but look upon as wasting ingenuity in a wrong direction.

Mr. Williams, Mr. Fowler, and other inventors, have practically demonstrated that several plough-shares and mould-boards united in a single frame may not only make very good work, but also be of considerably lighter draught than single and separate ploughs, taking an equal number of furrows. Not only is the draught less, but power is gained in another way, by combining a considerable number of ploughs together. A rope pulling three ploughs, at a speed of three miles per hour, is dragged twice as far in the same time as a rope hauling six ploughs at 1½ miles per hour; that is, the power wasted in dragging the rope itself is double in the former case what it is in the latter, for the same quantity of work turned over, to say nothing of the double amount of wear. There is also a saving of time. If a three-furrow plough traverse the field in three minutes, and waste one minute at the end, one quarter of the day is sacrificed out of work; whereas, if a six-furrow plough perform the journey in six minutes, the one minute at the end amounts to only one-seventh of the day. Let these considerations be borne in mind, while we proceed to notice various forms of ploughing machine used or proposed.

They are of two kinds—one for flat work, in which the furrows are all thrown one way; and the other for making "lands" or "stetches."

Turnwrest, one-way, or flat ploughing is adapted for light land, and may be practised also upon well-drained strong soils. The most successful steam-ploughs have hitherto been those constructed for this description of work, the advantage attending it being, that an implement, taking three or more furrows at once, can be worked without requiring to be turned round at the ends, and with anchorages gradually shifting along the headlands; whereas in ridge and furrow ploughing such an implement must be moved across to the other side of the "land" or "ridge," and the anchorages shifted a considerable distance forward or backward at every bout; while laying out the slack rope in the next track so far from the plough is also a difficulty. The implement having a simple to-and-fro motion, and the furrows all thrown the same side, it would appear at first sight very easy to fix two or three, or more, of Lowcock's turnwrest ploughs (with shares pointing both ways, and self-adjusting mould-boards) in a frame, after the manner of the common double-furrow plough. But the difficulty is, that the ploughs must change their position sideways at each end of the work, in order to "track" rightly in going opposite ways. Lord Willoughby has displayed great ingenuity in providing for this necessity, but the space required for allowing the ploughs to pass each other places one so far behind another, and time lost in adjusting them is so considerable, that the principle is objectionable. There seems no other course than to have duplicate sets of ploughs pointing in different directions, one carried in the air while the other is in work. Messrs. Fisken attach the ploughs to the ends of their windlass framework, travelling upon two pairs of wheels, one set at each end, and both pointing towards the carriage. The set out of work precedes, while that in work follows the windlass-carriage, the ploughs in each set being just far enough apart to allow the furrow-slices to turn over without danger of choking. Each plough-body is affixed to a separate lever, answering to the common plough-beam, and by very simple mechanism is raised or depressed at pleasure. Thus, instead of the ploughs entering or emerging from the soil simultaneously, they do so in succession, so as to plough square up to the headlands. In the system of direct-hauling by wire-rope, in which it is indispensable to avoid unnecessary mechanism, in order to have the implement as light and simple as possible, we can hardly expect such niceties as this; and, instead of an arrangement of levers, chains, screws, and sockets for lifting and lowering the ploughs individually, I can imagine no better principle than that of balancing two sets of fixed ploughs upon a single pair of wheels, as adopted by Mr. Fowler. The frame, hung midway upon the wheels, with a set of ploughs at each end, is tilted so as to bring the hindmost set into work; and when arrived at the headland, the attendant has simply to pull down the other end, and steer the implement in its next course when the rope begins to move it onward. The two sets of ploughs are immovably fixed upon the framing, pointing toward each other; the wheels, one running in the bottom of the furrow, left open at the last course, the other on the unploughed land, regulate depth and width of work, like the wheels of a horse-plough; and, by means of screws working in vertical standards, the frame can be adjusted upon the axletree, according to the depth of ploughing required. The steerage is accurately effected by slightly "locking" the wheels with a regulating screw, under the command of the ploughman, who rides upon the tail of the frame.

I attach great importance to the saving of time at the ends; and this is one reason for approving of the simple construction and action of Mr. Fowler's plough. One of the main advantages of this implement is the lightness of its draught. From numerous experiments with the dynamometer, it appears that the draught of common horse-ploughs, when out of work, is 30 to 35 per cent. of their draught when ploughing an ordinary furrow. Now, in Mr. Fowler's implement, this sliding of the weight of the ploughs on the furrow bottom is entirely avoided, the ploughs at one end of the frame balancing those at the other, so that the entire weight is carried upon the large patent-axled travelling wheels. I have tested the draught of the four-furrow plough running empty upon the surface of the land, and found it to be only 3 cwt.; the draught of 472 yards of wire rope dragging along the surface of a clover lea was 3 cwt.; the total draught of implement and rope being no more than that of four common ploughs drawn empty on the same surface. Of course, with the rope supported upon friction rollers, the actual draught is much less.

I would suggest as an improvement, that this plough should be constructed say with two beams of T iron shorter than the present wood beams, and with two diagonally placed beams at each end, made of tubular or angle iron, on which the plough skifes or the scarifying tines may be adjusted by clasps or bolts and screws, for different widths of furrow.

This implement, which, by ready alterations can plough ordinary furrows, trench two furrows deep with effect equal, in dry weather, to that of the spade, break up either whole or ploughed ground by cultivator tines, or pare with broadshare, seems to me just the convertible valuable implement we need in connection with steam-hauling machinery, as this versatility so materially reduces our first outlay.

I now pass on to a consideration of ploughing in lands, ridges, or stetches.

Steam-tillage ought to prove of greatest assistance to the heavy lands, and not only to light lands, which may claim the reaping machine as their gift from the mechanic, it being specially adapted to their upstanding crops; and from the restricted area of permanent subsoil-drainage yet in existence, as well as other circumstances, the great majority of farms on our strong wheat-soils are undoubtedly ploughed, and I fear must for many years be ploughed, in ridge-and-furrow "lands."

It would be possible to form a land with Mr. Fowler's plough, first going two courses (that is, once up and down the field) on one side of the ridge, and then, with considerable loss of time, turning the plough end for end, and going two courses to complete the other side; but, still better, the ploughs at one end of the frame might be left-hand, and the other right-hand ploughs, the implement then not being turned round. The slack or return ply of the rope following the plough would have to be laid out sometimes half a land's breadth aside from the track, and a guide wheel running along the last open furrow would be necessary to regulate the parallel distance of the next ridge. The anchorage, I think, would simply need to be shifted half a land's breadth at a time. But there is one objection. When we consider that one of the chief points of good ploughing is to form the sectional contour of the land in a proper curve, so that every furrow-slice shall be lower in regular gradation as we recede from the ridge (in order that the harrow edges of all may be equally prominent); and when we remember that a skilful ploughman secures this form by adjusting the width, depth, &c., of each furrow according to its distance from and relation to the ridge or water furrow, and according to the previous shape of the ground, we perceive that no implement ploughing all its furrows one unvarying depth and breadth can be well calculated for this description of work. Perhaps Mr. Fowler may improve his ploughing-machine for stetch work, by giving the workman power to alter the depth of either side of the frame without stopping for the purpose.

Mr. Williams suspends his single set of ploughs upon levers capable of working vertically in a carriage-frame, each plough being independently raised or lowered, but the machine has to be turned round at each end of the work at every course, and taken across to the other side of the land—a difficulty which I believe Mr. Williams has not yet overcome without the use of horses—and the alterations of depth, &c., necessary for different courses, must occasion considerable delay. But it is unnecessary for each plough to have a "swimming" motion independent of the rest. There appears to be no practical obstacle to the employment of a considerable number of ploughs rigidly fixed in a frame, but, on the contrary, the lightness of framing and adjustments in proportion to the breadth of ground operated upon (so important in lessening the load to be drawn) is in favour of such an arrangement. We might take half a "land" at a time, if the machine would not be too cumbrous, so that when the ploughs are once "set" (with regulating screws, &c.) to their proper depth and position, according to the form of the surface to be ploughed, no alteration whatever would be necessary. But a frame of six or seven ploughs following each other would be too long and unwieldly; therefore, let us turn half the furrows one way and half the other, the ploughs being in two sets, placed abreast, instead of following one another. The six ploughs will thus occupy only the same length of frame as three; the machine, indeed, with wheels in front and behind, will be of much the same dimensions as a scarifer. Mr. Coleman exhibited at Chelmsford a ploughing machine of this description, in which the ploughs were arranged in a V form, like a flock of wild-fowl. Suppose we attach the ploughs to the bars or beams of the framework by a fastening somewhat similar to that of Bentall's broadsharer, so that they can be adjusted to different depths and widths, according as the ground may be level or in ridge and furrow. By raising the fore-end of the frame upon its carriage wheels (with a wheel-and-screw or lever movement), the ploughs are run out of work of their own accord, and by depressing the front they are pointed in. Let there be two implements, ploughing only up to the windlass—in accordance with the method of hauling, described in a previous part of this paper. One is to "gather," or turn its furrows inwards, forming a ridge in the middle; the other is to "split," throwing its furrows outwards, leaving an open water-furrow in the middle; that is, the first implement makes "ridges," or "feerings," of a certain distance apart, and the other "makes up" the intervals, forming complete lands or stetches. Carriage wheels follow in the last furrows to sustain the weight of the implements, and for them to travel upon as they run backwards out of work. The manner in which the two implements would be worked, with a minimum of time lost at the ends, and a saving of power in several respects, has been already sufficiently described. I need merely refer now to the advantages of making the ploughs in each frame turn half their work opposite ways, and to the possibility of lightening the draught by avoiding sledging and sliding action as much as possible.

From numerous dynamometric experiments, it appears that in a heavy soil, if the whole draught of a plough in work be taken as 100, then, with the mould-board removed, it will be 90, drawn along an empty furrow it will be no less than 35, leaving 55 to represent the power required for cutting the slice. Much of the 35 per cent. may be saved by supporting the implement upon three or else four carriage-wheels, and shortening the sole as far as it can be done without causing the share to make a ragged uneven furrow-bottom. The 10 per cent. due to the action of the mould-board may also be reduced; for though the weight and friction of the soil upon the upper surface of the mould will remain, the weight lifted (several stones) may be mainly sustained by the travelling-wheels, instead of borne by the sledge formed of the sole and the heel of the mould-board. The 55 per cent. due to the operation of the share and coulter must not be supposed to arise merely from the dividing of the soil by their cutting edges; the share has a considerable weight of earth resting upon it, not only occasioning great friction upon the upper surface of the share (which cannot be obviated), but greatly adding to the pressure and friction of the under-side of the share upon the furrow-bottom. By forming the ploughs in our machine so that no part shall touch the furrow-bottom, except a small portion of the share-edges and soles, and by bearing the entire weight upon wheels of considerable diameter and broad peripheries—or, perhaps, applying the "endless-rails" to prevent sinking—a very large proportion of the friction, cohesion, &c., of the horse-plough may be dispensed with. There is also another consideration. A common plough exerts a great side-pressure against the upright land-side of the furrow, owing partly to the reaction of the furrow-slice in turning over sideways, but principally occasioned by the diagonal direction of the share's cut. If the cutting-edge of the share make an angle of forty-five degrees with the direction of the plough's advance, there will be a pressure against the side of the furrow equal to that needed to overcome the resistance directly in front of the share. But when we fix two sets of ploughs in a frame, half having right hand, and half left hand shares, instead of any side-thrusts being taken with a sliding action upon the face of the furrow, the side-pressures of all the ploughs neutralize each other. By proper attention to these points, I conceive that an economy of power would result.

I have not time to detail the simple steerage by slightly locking the axle of the front wheels, the adjusting of the hind wheels to make them act partially as "soles" to the ploughs, or the short coil of reserve rope and the clip by which it is held. I need merely add that all the arrangements might be very simple, and that the implements would travel with their wheels partly running on the unploughed ground, but chiefly along the smooth and clean furrow-bottoms, and only for an instant cross over the ploughed land. Of course the draught of a large implement taking six furrows at once must be heavy, but the load is sustained by the windlass and not by the anchorage. Perhaps the chief objection is the difficulty of making furrows of equable depth on uneven land by an implement of such great width.

Having now concluded my review of the subject of steam-ploughing properly so-called, and offered various suggestions for its better accomplishment, I must briefly allude to

NEW PROCESSES, ROTARY FORKING AND DIGGING.

First. *Implements operating by Traction.*—Mr. Smith, of Woolston, is very successfully carrying out a novel system of tillage, by means of trenching, subsoiling, and grubbing implements, without using the common plough except for turning over clover lea and sward land, and this, indeed, he thinks to be hardly necessary. He combines subsoiling tines with the double mould-board plough, and follows with the single subsoiler, so that the land is left ploughed up in "drills" or "ridges," the subsoil at the bottom of the open furrows and trenches broken up and exposed to the atmosphere, while the strips of ground covered by the upturned furrow-slices are also stirred and disintegrated. On all soils that are not thin or light, this must be a remarkably effectual fallow process; the partial inversion and complete stirring exposing such a large proportion of the staple and subsoil to atmospheric action. The subsoiling tines are exceedingly efficient, somewhat resembling spades, or square fluked anchors, in shape, and so sloped as not only to enter and pulverize deeply the entire breadth of a furrow each, but also to raise a considerable portion of the subsoil for admixture with the upper staple. And the various cultivators used (manufactured by Messrs. Howard, of Bedford) are remarkably simple, strong, and effective, and possess very admirable contrivances for steering, raising and lowering, and turning round. My paper being confined to mechanical methods of applying steam-power to tillage, rather than referring to tillage itself, I say no more here, except that Mr. Smith's land and crops testify to the soundness and value of his husbandry upon very heavy and also upon some other qualities of land; and his experience, fortified by that of various agriculturists, shows that there is economy in expeditiously breaking up ground by these implements at a total expense of 6s. 6d. to 10s. per acre.

We have been long familiar with the revolving harrow, forker, or scarifier, as brought before the public by Mr. Gibson, of Newcastle-upon-Tyne, Mr. Samuelson, of Banbury, and other inventors. And I believe the decision of practical judges respecting them to be that, while they may be admirable in certain cases for stirring ground already tilled, they are not able properly to break up and invert unploughed land. However, I do not quite despair of this form of digger for effecting the first and principal operation of tillage. Mr. Smith, of Lois-Weedon, has contrived an implement of this kind which answers perfectly well for pulverizing and lifting up the subsoil from the bottom of the trenches previously ploughed along his "intervals," casting the furrow-slices of staple underneath, and depositing the subsoil upon the top. The tines (of proper cycloidal curve), instead of being arranged upon separate discs, forming a set of independently-revolving rowels, are all fixed upon one barrel; as the machine advances, the earth is crumbled and raised bodily by the teeth, and while it hangs momentarily suspended in air before being cast off by fixed scrapers, a couple of small mould-boards gather the upper soil (previously turned by a plough) on each side into the bottom of the trench, the earth from the digger falling upon it.

Could not a simple implement of this character be made for ordinary husbandry, in which the whole surface has to be cultivated? Suppose a similar digging cylinder or wheel, to take only the width of a common furrow, preceded by a couple of skim-coulters or small ploughs, that would pare the stubble or sward, and cast it into the furrow left open at the previous course; then the earth raised by the digger might be diverted as it fell by a sloping mould-board, and laid upon the top of the thin slice deposited by the skim-coulters. In this way a perfect inversion and burying of the surface would be secured, while at the same time there would be a thorough comminution of the soil, and no pressure or sledging upon the furrow bottom. I think the draught of such an implement would be comparatively light, as the weight would all be supported upon the axis of the digging-wheel, and help to force the tines into the ground. The implement would also be very convertible; for, by taking off the mould-board we should have a rotary subsoiler instead of a trencher, the soil being mixed instead of inverted; and by adding other digging-barrels on each side, we might have a wide grubber or cultivator. For the purpose first mentioned—that of ploughing or trenching better than the plough—perhaps it would be equally efficient with the combined implement, proposed I believe by Mr. Fowler, in which a furrow-slice is ploughed the full depth, turned precisely upside-down, and then broken by the points of Norwegian-harrow rowells following upon it.

Hanson's potato forker is another form of rotating pulverizer. Could not Mr. Fowler apply the revolving blades or tines to cut the furrow slices of his plough crosswise? Motion might be derived from one of the travelling wheels, and thus ploughing and pulverizing would be accomplished in a single act.

Leaving now the traction principle altogether, which, in the case both of ploughing and scarifying by steam must be now pronounced fully successful, let us inquire into the merits of

MACHINES ACTUATED INDEPENDENTLY OF TRACTION.

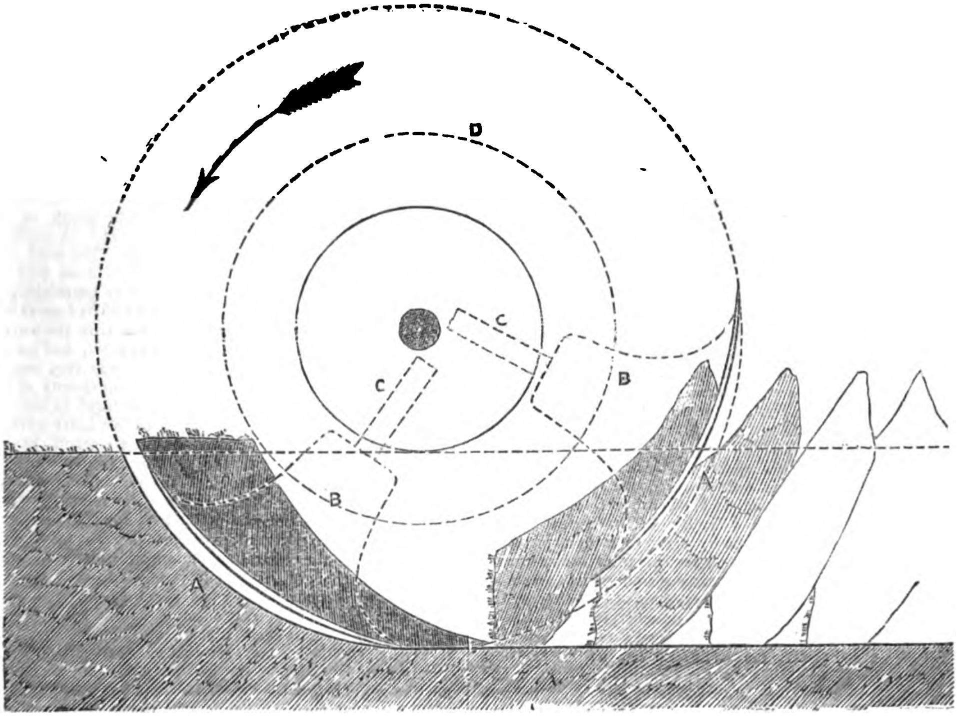
I dismiss without notice multitudinous contrivances for imitating the motions of manual digging, partly because they would demand more space than I feel at liberty to devote to them, and partly because I prefer, for simplicity and practicable character, machines having a continuous circular motion and few working parts; and indeed, I believe, that ultimately the highest order of results which steam-culture will ever attain, will be by a revolving tiller, because, theoretically, it is best adapted to the new motive-power.

The idea of Mr. Hoskyns, that a cylinder of claws, tines, or cutters, should be attached behind a locomotive engine, and driven at a more or less rapid speed by the motive-power, notwithstanding the success of steam-traction implements, never promised better than it does now. I do not know what has become of Mr. John Bethell's revolving forker, but, at any rate, Mr. Romaine's machine in the hands of Mr. Alfred Crosskill has at last achieved considerable success, the velocity of the digger, however, being greatly moderated from that originally proposed. A rapidly revolving scratching tool may serve for superficial slicing and mincing as a substitute for paring; but in order to invert the soil completely, and perform the best kind of work required by the farmer in deep culture (for which digging machines seem most suited), I am of opinion that the soil must be cut or broken into pieces of sufficient bulk to be turned bodily upside down, and these must not be left to fall at hazard in any posture, but laid in their proper position by the machine, in order to make perfect work. This operation necessitates a slow rather than a quick rotation of the cutters; accordingly Mr. Usher's rotary steam-plough, in which a series of curved plough bodies are attached about a horizontal axis driven by gear work, behind a locomotive engine, was a near approach to what we required, and had the tilling machinery been combined with a modification of the endless railway engine, or the difficulty of locomotion been otherwise better overcome, this invention would probably have given us a cheap, though not very perfect, order of tillage. But Mr. Romaine's cultivator is a decided success. A digging-cylinder, 6 feet wide, is attached behind a twelve-horse engine, mounted on a pair of very large broad felloed wheels, with two steerage-wheels on castors in front. The machine is perfectly independent of horses for travelling from place to place over moderately level roads or arable fields, though its weight is 10 tons, and it will turn short round, or in an area of its own length. Parallel connecting-rods, like those coupling the wheels of a railway locomotive, are used for driving the digger with a speed of forty to fifty revolutions per minute, allowing it to be readily raised or lowered while in motion. The cutters, fastened by bolts and screws upon the plate-iron cylinder, resemble scarifier paring-shares in form, and, as the engine slowly advances, slice and dig up the soil from either 3 or 4 inches to 10 inches deep, as required. Having seen the work done, I can bear witness that tenacious soil is thoroughly broken up and subdivided, the surface-stubble, &c., buried sufficiently well, and the subsoil largely upturned and intermingled with the top staple—in fact, the work has much the appearance of that of the digging-fork. The successive operations of ploughing, dragging, and harrowing strong land are equalled by a single course of this machine, and at far cheaper cost, the amount of work done being from four to seven acres a-day, according to the description of soil and depth of work, at an expense of 5s. or 6s., up to 9s. or 10s. per acre. The price, I believe, is about £800. It is a matter for experience to determine how far the weight may prove injuriously consolidating on stiff clays, and whether the farmer can keep in order so many wheels, running bearings, and working-parts. The cultivating cylinder, however, promises to become all that the farmer requires; only, for working on ground already ploughed or cultivated, on hilly fields, and on wet clay soils, I hope means will be found to actuate it by ropes from a shifting or stationary engine.

In searching out and studying all the proposals I can meet with for digging or deeply trenching, I have concluded that the simplest, easiest, and most practicable idea, is that of a cutting-blade attached by an arm or stem to a horizontal axis, and curved concentrically, or nearly so, with the circle it describes, which entering the soil downwards, shall cut a curved spit of earth from the face of the semicircular trench formed by its action, and emerging upwards on the other side of the trench, leave the spit in an inverted position, as represented in the annexed woodcut.

A number of these cutters are to be affixed by radial arms to the shaft, but in order that they may not impede the delivery of the pieces of soil from each other, I propose that they should be placed at an angle with the plane of the circle they describe, and let the machine advance at right angles to the direction of their revolution, the axis being longitudinal instead of transverse, just as in Hanson's potato digger, and Huckvale's turnip thinner. The digging-disc (supported and actuated in a way to be presently noticed,) proceeds sideways, as it were, along the trench, slicing off spits from the face or edge as a workman does with a spade, and carrying and leaving them on the opposite side inverted and turned end for end. The arm or bracket to which each cutting blade is attached acts as a coulter to divide the portion to be cut. Suppose the blades to be of 9 inches breadth, then one blade must enter the ground for every 9 inches travelled by the machine; and with six cutters following one another (somewhat after the manner of the knives in Gardner's turnip slicer) the revolutions per minute will be only 29, for a progression of 1½ miles per hour. The "bite" or thickness of the spit may be, say 7 inches, when the depth is a foot; thus, for a single digging disc, the extent of land dug would be at the rate of one and 1·5th acres per day; but, of course, I propose to have several diggers on the same shaft. Working at less depth, the speed might be increased. For going 12 or even 15 inches deep, the disc need not be of greater diameter than say three, or at most four feet. And it is to be noted, that though of small diameter, as the digger works always in the trench, a spur-wheel of considerable size may be hung on the same shaft to drive it. I propose that the machine should traverse up and down the field, without turning at the ends, the digging disc always remaining in the trench and revolving the same way. The only change necessary is to point the cutting blades at a different angle when the machine is to travel the reverse way; and this is done by setting each arm or stem in a socket, and connecting the six arms so that they are turned round simultaneously. The blades are double-edged, in order that they may be turned round so as to bring the arms into operation as coulters, whichever way the machine may be moving. But the form of cutter proposed is also adapted for revolving upon a transverse shaft or cylinder like Romaine's.

Motion may be communicated to the digging-wheel in several ways. It may be affixed to a locomotive engine. But I should prefer to drive it by an endless



A A Position of digging-blades on entering and on rising out of the soil, cutting a spit say 8 inches thick and 9 inches wide, with the trench 15 inches deep.

B B The stems or arms supporting the blades are sharp at their edges, so as to act as coulters, for severing the side of the spit from the whole ground. The blades are set diagonally across the plane of the circle there described, so as not to track after each other; and are turned round in sockets C C, when required to point the other way, for the return course.

D Size of the wheel by which the digger is driven.

rope, supported upon friction rollers, in connexion with a stationary engine, or an engine shifted along one end of the field—a modification, in fact, of Mr. Atkins' and Messrs. Fisken's method. For a single digging-disc, perhaps there would not be too great a resistance to be driven by wheel-work from the travelling-wheels of the carriage-frame, on the principle of Hanson's potato-digger: the wheel having teeth or cogs upon its felloe to give it a firm hold of the ground, might travel along the bottom of the trench, and so partially operate also as a sub-pulverizer, breaking up the hard bottom; and as the digging-disc is adapted to a pace of two miles per hour, horses might work it if required. I would suggest, however, that in case the bite and resistance thus obtained were found insufficient for very deep work, a couple of wire-ropes wound upon the drums of the machine, and fastened down at both ends of the field by shifting anchors, would cause the drums and connected gear-work to revolve by the simple advance of the machine; though this travelling windlass would involve considerable weight and complexity.

My description of this rotary digger is very general and devoid of details, the rather rude drawings accompanying this paper merely giving some idea of the circular cutting and inverting of a movement I advocate, and, in fact, it is not the particular form, but the distinctive principle of action involved, that I wish to bring before you.

In conclusion, let me hope that at least some of my suggestions with respect to working traction implements by steam-power, and the construction of new tillage machines, will prove useful to some gentlemen who may be practically grappling with the mechanical difficulties in the field, and that the principle I have introduced to your notice for deep-digging and perfectly inverting the soil, with the least possible waste of power in raising the cut pieces, will meet with your consideration and approval.

On the conclusion of Mr. Clarke's paper the Secretary read the following letter:

SIR,—In the *Journal* of this Society for February, 1856, are a few remarks I then made on the subject of ploughing or land cultivation by steam-power. These impressions were arrived at, and forced upon my mind by the importance of the subject, and by frequently witnessing the various methods (ingenious and persevering) by which the desideratum was sought to be accomplished. I would now frankly have renounced my ideas, and cordially have congratulated any inventor who had, by this time, made the progress then hoped for, and which their great efforts have really deserved; but feeling, as I do, that so little improvement has been made in the art by any of the methods during these two years, I am more convinced we are not yet in the right path to the possession of an implement such as would generally supersede the good horse plough, and which the enterprising agriculturist would hail with pleasure and readily adopt. Sincerely feeling, as I do, how very ungenerous and hard it may seem to these energetic pioneers to dwell on their unrewarded efforts, I would gladly adopt any course of remarks or argument which would avoid allusion to a failure or touch a disappointed hope, and would therefore briefly state that from all I have yet seen or heard of improvements and trials of the now existing means, I am forced back to the conclusion I had arrived at in February, 1856, that the thorough and practical steam cultivator is to be wrought out of such a construction of machine as I then sketched. It may with seeming justice be asked, why I disapprove of all existing plans, and still do not produce my own idea in a competitive form. My answer is, that during these years I have, through impaired health, been compelled to relinquish, in a great measure, the practical management of our somewhat large manufacturing business, and those left to do so find their heads and hands full enough in grappling with the large and small details of works requiring increasing attention.

The machine I had sketched in 1856 I still think well worth the consideration of one or more possessing the ability and bold determination of some of the gentlemen I have alluded to; and should success be theirs, I will be satisfied with that which is only due to me, for having pointed to the outline of an implement for so desirable an object. I would very shortly repeat that the machine I proposed was in the form of a portable engine, not much exceeding in weight and size that now used to work a combined thrashing machine; the addition and difference would consist in a frame containing a number of digging spades, and the application of the engine's power to the up and downward motion of the spades and turning over the pieces of soil they lifted, much in the same way as a man does with a spade. I think I may fearlessly assert that no plough has ever equalled the spade in the beneficial results to the soil and its productions; the expense and insurmountable difficulty of having the work done within the necessary time by men being the objections; and, if so, then the implement we really require is some twenty or more spades worked by the uncomplaining giant steam, so obedient and untiring. The arrangement of the spades, and their required motion, are not insurmountable difficulties in the science of mechanics, while the engine's weight, instead of being a drawback as at present, would be the intermediate power by which I would force the spades into the ground, and these spades would act as so many levers, by which the machine would be moved step by step. No space, whether the field was large or small, would be left untilled any more than in the case of the best ploughing, and the digging would be deep or shallow at the option of the attendant, or as the frame had been set for him. No power would be misspent; the whole apparatus would be as free from derangement as the portable engine and thrashing machine now are, and quite as portable; for when the work was done, the spade frame would either be lifted clear of the ground, or disengaged, and the travelling wheels left free for locomotion. In common with so many, I long to see an efficient machine for such a great work; and if my ideas should now fall into genial soil, my object is served. I am, &c.,

RICHARD GARRETT.

Leiston Works, Saxmundham.

The CHAIRMAN said this was a most important subject, for he thought we were in a state of transition as regarded the cultivation of the soil. He had no doubt that, in process of time, the ingenuity of this and other countries combined would bring steam-ploughing, as well as reaping by machinery, into general use. More attention was required to the machine itself than to the engine which was to work it; the latter might be considered as having been brought almost to a state of perfection. He had an opportunity, at the Paris Exhibition, of witnessing the operations of from twelve to fifteen different steam reaping-machines, and he had reported upon them to the Government of this country. Throughout those experiments, it struck him very forcibly that more was wanted from the farmer than from the engineer, inasmuch as a great deal depended upon the land being brought into a state fit for the application of machinery. Until attention was paid by the farmer to this point, it was in vain for engineers and inventors to bring forward machinery for the cultivation of the soil. It appeared to him that, in good cultivation, the first step was to carry off the surplus water by a complete system of drainage, to increase the depth of the staple, and to bring to the surface portions of the subsoil. He believed, if those necessary preliminaries were carried out, they might apply machinery to the cultivation of the soil with good effect, and at a cost which would be within the means, not only of the gentleman-agriculturist, but also of the tenant-farmer. He saw many practical men present, and would be happy to hear their observations on this highly interesting subject.

Mr. J. J. MECHI was of opinion that steam-cultivation would, ere long, become the custom of the country. He would mention that two years ago Mr. John Fowler ploughed a quantity of land for him, and he could assure them of the marked superiority of the crops on the land so treated, as compared with that subjected to the ordinary horse-ploughing. There was a difference in the crop of wheat, of at least a quarter per acre in favour of ploughing by steam. The superiority was apparent from the first appearance of the crop, and was maintained up to the time of harvest. The depth to which the land was ploughed was considerable, and, in addition to this, subsoil ploughing was also employed. The work was allowed, even by the labourers, to have been done with much greater regularity than could be effected by horse-ploughing, and fresh soil was brought to the surface which had never before been disturbed by any implement. It was true the work was done some little time before the crop was sown, and no doubt the action of the air upon the raw subsoil was very beneficial. He thought they would all agree as to the superiority of steam over horse-power, wherever it could be brought to bear. An acre of ploughing per day was considered fair horse-work, and that would be done by 2 o'clock in the afternoon, at which time the horses returned to the stables, and remained there eating and sleeping till 6 o'clock the next morning. In the summer months especially, an immense amount of time was thus wasted, and the horses must be kept and fed whether they worked or not; so that all experience tended to show that horse-power in the cultivation of land was but a make-shift, and must, he thought, ultimately succumb to mechanical contrivances. His impression, some years ago, was that Romaine's engine would be very effective, and he had spent some £700 in experiments with that machine. Since then he believed £10,000 had been expended in experiments, and with very important results. He had no doubt larger sums yet must be spent before they arrived at perfection, and every year would witness large improvements in the application of steam machinery to the purposes of agriculture, as was the case with regard to manufactures. He hoped the farmers of the country would be sufficiently alive to the importance of adopting these appliances when they were offered to them. It was certainly not the duty of the tenant farmers to lay out their money in making these experiments, but at the same time they ought to be willing to pay a fair remuneration to those who afforded them the means of carrying on superior cultivation at a cheaper rate. By the facilities of inter-communication afforded by railways, many local prejudices had been abolished, and districts which formerly prided themselves that they were in the van in agricultural matters, discovered how much they were behindhand. After all, depth of cultivation after good draining was the true manure. Let the subsoil be brought into contact with the air, and they would find a treasure which had never before been developed. He had every year increased the depth of cultivation on his land, and had always been rewarded for it. Recently he had a field dug all over with the steel digging-fork, and he had found it more economical in its results than ploughing with horses. There were five horses ploughing in one field, and in another field four men fork-digging, and he found the latter cheaper at £2 per acre, the men earning 2s. 6d. per day, than the work of five horses and two men in ordinary ploughing. The more he saw of horse-power, the more convinced he was that it was the worst and most costly power that could be employed, but at present the use of it was unavoidable.

Mr. J. ALLAN RANSOME said, that the very able paper they had heard was certainly a most accurate record of all that had been done in the application of steam machinery to agricultural purposes up to the present time, and many of the suggestions put forth, he felt, were extremely valuable. On the two previous occasions on which he had attended discussions on this subject, practical progress in this direction had been shown to be extremely limited. With the exception of a little work carried on in one season on Mr. Smith's farm, nothing had been practically done when the subject was first discussed in that room—at least so as to induce others to follow in the same steps. Since that time great improvements had taken place in the three leading plans referred to in this paper, namely, first the locomotive traction engine drawing an implement after it; secondly, the steam-engine employed to give motion to rotary machinery; and thirdly, the employment of traction ropes with a fixed engine. He had already expressed an opinion in favour of traction by means of stationary engines. His attention had been principally directed to the latter system, from the belief he entertained that the best practical results would be derived from it. Looking at the results of Fowler's method of steam-ploughing, it had up to the present time been found very effective. This was shown by the fact of a twelve-horse engine working five ploughs during the week, at the rate of an acre per hour. To accomplish the same work with horse-power, would take sixteen horses. The number of men in the one case was five, and in the other eight. In the one case they must be all skilled ploughmen; whilst in the other they required only one person competent to drive an engine, another able to guide the ploughs, and the remainder could be done by boys. It was further to be remarked that, during the necessary period of rest and feeding both for men and horses, the steam engine might be employed in other operations on the farm. He would now speak of another class of implements. The plough was universally admitted to be inferior to the spade. Why was that so? There must be some detrimental effects produced in ploughing which must be set against the good done to the land. In the first place, there was the treading of the horses' feet; and, in the next place, the hardening of the soil by the action of the broad bottom of the plough. He regarded the implement which had a tendency to break up and comminute the soil as the nearest approach to perfection; and where the steam plough had been introduced, with the avoidance of friction, and where the soil was broken up by an implement following in the wake of the plough, he believed it was quite equal to the process of digging; and he thought this might be effected by the traction rope and fixed engine. At the same time, he thought that a lighter description of engine might be adopted, which could be used as a rotary travelling engine. But, whilst there was work sufficient for each manufacturer in his individual line, he thought ploughing by traction had been almost brought to perfection; but, with regard to a thoroughly practical digging machine, he feared that the probability of success was rather remote. The necessary complication of such a machine would stand in the way of its success. He lamented as much as any one that the state of his friend Mr. Garrett's health had delayed his further progress in that direction, but his friends might console themselves that he had thus been released from a matter which would certainly have occasioned him a great deal of anxiety; and in the event of Mr. Garrett's restoration to health, he (Mr. Ransome) would advise him not to expend his energies upon the invention of a digging implement to be worked by steam.

Mr. J. J. MECHI mentioned, as a proof that Fowler's method of ploughing was coming largely into use, that a contract was taken for ploughing 200 acres by this plan on a farm in Essex. This showed that it was in large practical operation, and he had no doubt that it would answer.

Mr. NEWTON, although not a practical agriculturist, would venture to differ from some of the views expressed by Mr. Ransome. He did not think ploughing—taking the plough in the form in which they were acquainted with it—could be beneficially carried out to any great extent in this country by means of traction power. Whether the implement was capable of modification, so as to obviate the hard under surface occasioned by the sole of the plough, he could not say. Every agriculturist would admit that ploughing was not so beneficial an operation in the preparation of the land as hand labour with the spade, but this was so expensive as to be out of the question. He thought the application of traction by ropes to the plough involved great waste of power, and the friction of the rope on the ground occasioned an amount of wear and tear which formed a serious item of expense. Nor was that the only objection to ploughing by steam under the method adopted by Mr. Fowler. There must be great waste of time, especially in small fields of six or seven acres, in arranging the anchors and windlass, and also in the lateral shifting on the headland. It was stated in the paper in some instances to occupy 25 per cent. of time throughout the whole of the day. That formed a serious item. If they had large fields, such as were seen on the continent, the case might be different, and in fields of 100 or 150 acres Mr. Fowler's plan could probably be carried out with advantage. They must, however, take the case as it stood in this country. They could not remodel estates.

Mr. MECHI said this must be done.

Mr. NEWTON very much questioned whether the landlords as a body would allow their tenants to grub up the hedges, and cut down the trees, to form open lands on their farms. Reference had been made to Romaine's cultivator. That machine could be taken to any field where the gateway was wide enough to admit it, and every foot of the land could be cultivated by it, without any further operation being required; besides which, it was capable of being adapted to all the purposes for which the portable steam-engine was employed upon a farm. The cost of that machine was stated in the paper to be £700. It ought, however, to be borne in mind, that an implement of that kind dispensed with a considerable amount of horse-power. He believed it was not generally known that the horse-power for agricultural purposes in this country consumed from one-fifth to one-sixth of the whole produce of the land.

Mr. MECHI said, on small and moderately cultivated farms it would amount to one-fourth. On well-cultivated lands it would be about one-fifth.

Mr. NEWTON added that such an item in the expenditure on a farm was very serious. He repeated his belief that the system introduced by Romaine would ultimately be found to be most successful in the cultivation of the land, from the fact that all the necessary operations were effected at once.

Mr. MECHI wished to explain, that in stating the consumption of the horses on a farm to be, in some cases, one-fourth of the produce, he did not mean one-fourth in value, as of course horses were not fed upon wheat, but the produce arising from one-fourth of the extent of the farm.

Mr. JOHN FOWLER had listened with great interest to the able paper of Mr. Clarke, which he regarded as a most excellent *resume* of what had been effected in steam culture up to the present period, and an extremely fair criticism upon the merits of each invention. With reference to the remarks of Mr. Newton, although he agreed with him in the belief that rotary cultivation in some shape or other would be ultimately brought to bear, yet they could hardly assume that it would do all that was required. It was possible that rotary cultivation might effect the overturning of the soil, and he believed there was no very great difficulty in bringing it to bear for that purpose on level and firm soils, but upon very uneven surfaces the power expended in taking the machine over them must be very great. Of course there were many improvements in detail which might be made in such a machine; and he should be glad to see the gentlemen-agriculturists of England, for it was not the place of the tenant farmers to do it, appropriating a small portion of the income which they derived from the land to experiments in rotary cultivation. With regard to himself, he ventured to say that the system of ploughing he had introduced was a step in the right direction. He thought there could be no question that it was a really practical plan, inasmuch as it performed the ploughing at half the cost of horse-power, and the work was better done. He was happy to have the testimony of Mr. Mechi in its favour, though it was by no means the first he had had. Seven acres of sandy soil, in the neighbourhood of Ipswich, had been ploughed by steam, and the result was, even on land which had no rich subsoil to be turned up, that a yield of a quarter per acre more in the crop was obtained. The people in the neighbourhood suggested that the difference arose from the depth of the tillage having prevented the drought from attacking the wheat. He admitted the superiority of hand-spade cultivation over even steam ploughing, but it was too expensive in practice, and he was prepared to say that, on heavy clay land, steam cultivation, equal to spade labour, could be done for 12s. an acre. With regard to the wear and tear of the rope under his system, a misapprehension existed. Upon clay land he would guarantee the wear of the rope at sixpence per acre; he believed it would not exceed threepence per acre; but if the work was done upon gravelly soil abounding with sharp flint stones, greater care was necessary with regard to the rope, although in such cases he believed the expense would not be greater; but if farmers used the rope in the careless manner they frequently did their steam engines, of course they must be content to bear the expense of their negligence. Judging of what he had seen of rotary cultivators, he believed that they would occupy a prominent position in a few years, and no pains should be spared to bring this about. There was one point which bore materially upon steam cultivation. The moment they were prepared to do all the cultivation on a farm by means of machinery more advantageously than by horse-power, horses themselves would only be required for the carting, and would have to stand idle a large portion of the week. This showed the importance of bringing about a perfect system of steam traction. Mr. Boydell had gone far to develop that. He (Mr. Fowler) believed that a smaller class of that description of engine—say, of four-horse power—could be used for the work of a farm more economically than horses. He thought it ought to be fairly tried. Who was to try all those experiments? Were the inventors to bear the whole brunt of that which was in fact a national benefit? The landlords hitherto had done little. The Royal Agricultural Society had given no help. He could only state that the trial of his system at Salisbury was appointed to take place on a steep hill, resembling the roof of a house, and the decision arrived at was, that the steam plough would not answer. Notwithstanding all this, he was prepared to prove that he could plough at half the cost of horse power. It was plain they would get no assistance from the public or from the landed proprietors, who would, after all, derive the greatest benefits in the improved rental of their estates. As far as steam ploughing was concerned, he considered his task was done; but it was for such men as Messrs. Romaine and Boydell to carry their experiments further in another direction, and he was strongly of opinion that the public at large ought to help them in their work.

Mr. **Smith** (of Woolston) avowed his determination not to receive any assistance from any society or any individual. He would state his reasons for not using the combined plough for the inversion of the soil. In January, 1856,[*] he stated before this Society what he had done in the way of steam tillage up to that period, and he would now state what he done further since that period. He would not speak of his own plough, but would refer to the machinery employed for laying out the land, and the mode in which he effected it, as upon that he considered the success of his system of tillage mainly depended. In the two experiments referred to by Mr. Clarke in his paper, one at Chelmsford and the other at Woolston, he (Mr. Smith) had not space enough to show properly how he set out his work. Mr. Smith proceeded to explain the details of his plan, particularly describing the mode of setting out his machinery and tackle. (This, however, would be unintelligible without the plans and sketches to which he referred.) Mr. Smith went on to remark, with reference to steam culture, that all farmers would admit that the first month after harvest was worth all the other months of the year put together. There were, in fact, only two months which were really valuable to the farmer for ploughing. Those were Sept. and October. The engine which he recommended was the common eight-horse engine, but he had found a seven-horse engine sufficient for all his work, upon a farm of about 200 acres, 110 of which were arable; and the engine could do all the thrashing, grinding, cutting, &c. The tackle to be attached to it, he contended, was paid for in the first season it was used. He had found in his own experience and that of his brother-farmers, that a quarter per acre more in the yield of the crops resulted from his system. Mr. Smith next proceeded to contrast the system of anchorage and rope traction adopted by Mr. Fowler with his own plan, and pointed out the important reduction he had made in the number of horses he had employed previously to the introduction of his system of steam cultivation. In the first year he steam-ploughed a field twice over; and the yield was 41 bushels of peas per acre. The succeeding crop was barley; and the yield of that was 7 qrs. 1 bushel per acre, from land which formerly only gave a yield of 5 qrs. per acre. Upon an average, he employed his steam machinery in culture 39 days in the year, consuming 14½ tons of coal, at a cost of £14 10s. The only additional cost was in increased labour; for during that period he had allowed his men sixpence a day extra. Mr. Smith then read letters from Mr. Randell, of Chadbury, near Evesham; Mr. Bright, of Teddesley; Mr. J. Whiting, of Stoke Goldington; and Mr. George Taylor, of Mentmore, speaking of the successful working of Mr. Smith's system of steam cultivation on land in their occupation or under their management.

The **Chairman** regretted that the time had arrived for closing this discussion, more especially as he saw present several other inventors—amongst them Mr. Halkett—from whom he had hoped to hear some observations on this highly important subject. They would, however, all agree that Mr. Clarke was entitled to their best thanks for his able paper.

A vote of thanks was then passed to Mr. Clarke.

MR. HALL MAXWELL AND THE AGRICULTURAL STATISTICS OF SCOTLAND.

At Inverury, and within the Kintore Arms Inn there, the sixth day of February, Eighteen Hundred and Fifty-Eight; at a numerously attended meeting of Enumerators and members of committee connected with the Statistical Inquiry for the Counties of Aberdeen, Banff, and Moray:

On the motion of Mr. **Copeland**, Haddo House, Mr. Geddes, Orbliston, enumerator for Morayshire, was called to the chair; and Mr. Murdoch Huntley was requested to act as clerk to the meeting.

The following resolutions were moved by Mr. **Harvey**, of Tillygreig, seconded by Mr. **Jopp Seggat**, and unanimously agreed to, viz.:

"1. That the enumerators and members of committee present were induced to take charge of the Statistical Inquiry in their several districts and parishes, from a firm conviction that it would confer a great benefit not only on agriculturists, but on the community at large, and they had the more confidence in doing so from the fact that it was conducted under the auspices of the Highland and Agricultural Society of Scotland."

"2. That the meeting having had ample opportunities of admiring the great tact, zeal, and ability displayed in conducting the inquiry by Mr. Hall Maxwell, the secretary of the society, to whose indefatigable exertions the success which has hitherto attended it is mainly due, have observed with much regret that the requirements of Government from that gentleman have been such as to render the withdrawal of his services, and the consequent dissolution of the Highland and Agricultural Society's connection with the statistical inquiry necessary."

"3. That the meeting, referring to the growing interest taken in the agricultural reports, are satisfied that the measures adopted by Mr. Hall Maxwell for collecting the statistics—embracing as they do popularity, correctness, and economy—have obtained the greatest confidence among all classes connected with the inquiry, and produced a mass of such accurate and valuable information as could not otherwise have been readily procured."

"4. That the meeting having felt the utmost satisfaction in co-operating with Mr. Hall Maxwell in preparing the statistics during the last four years, though the employment as enumerators and members of committee was altogether unsolicited on their part, trust that matters may yet be arranged so as not to deprive the country of a system so thoroughly organized, and which, though apparently of an inquisitorial nature, has never been felt as such."

"5. That the Chairman be instructed to forward these resolutions to the Highland and Agricultural Society, and to send copies thereof to the Lords-lieutenant of Aberdeen, Banff, and Morayshires, to the Members of Parliament for these counties and burghs connected therewith, to the Right Honourable Lord Kinnaird, and to Sir James H. D. Elphinstone, of Logie Elphinstone, M.P." **Jas. Geddes**, Chairman.

NORFOLK AGRICULTURAL SOCIETY.—In consequence of the decision arrived at by the late annual meeting with regard to the reserved fund, the premiums in all classes have been augmented to the extent of about £40. The classes of pigs are to be divided into the large and small breed. A new prize is to be offered for the best dairy cow of any breed, not being a Shorthorn, Devon, or polled cow. The money prizes for implements are to be given to collections instead of single implements. And medals will be awarded to newly-invented or recently-improved implements. The annual exhibition will, it is expected, be held at Norwich, Friday, June 18.

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[*] See *Journal*, vol. iv. p. 175.

CHOOSING A SITE FOR A HOUSE.

In selecting a site for a country farm house, many things are to be taken into consideration. The question of healthfulness is of the first importance. Such situations as the border of a sluggish stream or of a stagnant marsh should be avoided. Soils retentive of moisture, and which draining cannot render dry and warm, should not be chosen. In such situations, desirable as they may be in other respects, the air is raw and chilly, the dampness rises through the walls and apartments of the house, discolours the paper hangings, spoils the food, diffuses a musty odour through every room, depresses the spirits, and injures the health of all the occupants.

Convenience and comfort should be considered. Fine prospects are fine things, but everything must not be sacrificed to obtain them. It would be folly in a farmer to perch his house on the highest peak on his estate, regardless of convenience of access to and from the highway, market, church, post-office, &c. Poets and "men of genius" may do such things, but ordinary mortals must have an eye to the common wants and comforts of life. Hence, we would set our house within easy reach from the road. It should, not, indeed, stand close to the street, exposed to noise and dust, and to the prying curiosity of every passer-by. There is no need of crowding one's house upon the roadside. We beg pardon for saying it, it looks stingy to do so, and it looks as if the owner were excessively anxious to see and to be seen. Far better is it to lay off a liberal space in front and on the sides of the house, where trees and grass may grow undisturbed, and where the members of the household may enjoy themselves without undue exposure from the highway. Home is much less home if it have no privacy, if every opened door and window lets in the gaze of street-goers. We pity the members of that family who have no resources within themselves; who cannot find happiness in books, papers, company, music, trees and flowers, domestic labours and amusements, but must be for ever pining to learn the thousand little occurrences and gossip of the neighbourhood. Yet we would not go to the other extreme. Man is a social being, and it is very pleasant to see the faces and hear the voices of those who live about us. It is pleasant, especially for invalids, confined most of the time within doors, to be able to see from the windows of the house who are coming and going, and what is transpiring in the street. Then, in winter, it is very laborious to keep open paths to the highway from a house situated far from the road. We would, therefore, drive our stakes at a moderate distance from the street, leaving room enough in front of the house for lawn, trees and flowers, and yet so near the road as to be easy of access.

An elevated site is desirable, on many accounts. It affords facilities for drainage. The air is purer, drier and more bracing. The prospect afforded of the surrounding scenery is worth more than is generally paid for it: scenery is a gallery of pictures painted by the Great Artist. It is not all poetry to say that such a situation tends to inspire its occupants with an elevation of thought and feeling. Yet it must be borne in mind that such sites are exposed to violent winds, that in winter they are often blocked up by snow-drifts, that one must toil up and down the hills all his life, and that his loaded teams must daily be dragged up hill, or struggled with in going down. By no means should one take a calm, summer day to examine a hill-top for this purpose; let him rather choose a season of unpleasant weather, and if it bears examination then, it will be likely to prove satisfactory at other times. Most hill-tops are bleak, yet one is not sure of escaping severe winds by building in a low situation. Gales often sweep up and down valleys with great violence, with a sort of wildness and madness unknown on the hills. Blustering as is the winter weather of hilly regions, the actual cold, as measured by the thermometer, is seldom as great as that of the valleys, and late frosts seldom do as much damage in the one case as in the other. A sheltered situation is undoubtedly preferable to one open on all sides, and such a situation can hardly be found on a hill, yet much can be gained even on the most elevated spot, by planting belts of trees, chiefly evergreens, on the sides most exposed to the rake of the winds. In respect to elevation, our own choice would fix upon a gentle slope raised just above the damps and late frosts of the valley, and protected from the north winds by tree-clad hills.

It is often recommended to chose a site already clothed, more or less, with forest trees. There are advantages, certainly, in having such a basis for ornamental operations. It is a great saving of time and labour to buy your shade-trees already-grown. All you have to do in such cases, is to cut out roads and walks wherever they are wanted, to open up a prospect here, and plant a denser thicket there, and so to smooth out the tangled locks of nature as to develope her finest charms. This is all very well where it can be done; but such situations cannot always be found, combining, also, the other important features to which we have just alluded. And where they cannot be found, we would select one possessing the other desirable qualities, and then proceed at once to plant the ground with the best trees and in the best manner. With careful treatment, such trees will grow rapidly and develope a greater beauty than the tall, naked denizens of the forest ever present. Whether one lives to see his trees attain great size or not, is really of no consequence. There is more enjoyment in planting trees and watching their yearly improvement, than in sitting idly under trees already grown. A thousand associations spring up from year to year, and cluster around such trees. They are *your trees*:

you selected them, planted them, nursed them in their feebleness, defended them from their enemies, rejoiced in their prosperous growth, and now you gaze upon their spreading boughs and thickening shade with a sort of paternal pride and affection which you feel towards no other trees. Indeed, for our own part, we should shed few tears on being obliged to take a site without a tree upon it, —so far superior do we consider the pleasure of creating an attractive place of residence, to that of buying one already made. But tastes differ.
—COUNTRY GENTLEMAN. A. D. G.

ON UNIFORMITY IN NAME OF THE DIFFERENT ANIMALS OF THE FARM.

A considerable discussion is now going on throughout the country, relative to uniformity of weights and measures, The time, therefore, may not be inappropriate to introduce the subject as named above, embracing the multifarious and incongruous names as applied to the different farm animals, of the same age, kind, and character, in various parts of the country; a synopsis of which I give below. It is true that no great benefit is to be derived from adopting a uniform series of names to designate the same animals in different districts; but it seems to be very desirable for general information, and to give more simplicity to our farm designations. To foreigners, reading our works on agriculture, it must be very perplexing; and in our own country, our agricultural readers are often at a loss to understand the common and varied terms applied to the same animal in various localities, these terms by no means being descriptive of the animal, often the very contrary. Who would suppose the term "Hog" meant a sheep of one year old? Then, the terms "Chilver" and "Tiddlin," as applied to lambs: or Dinmont, Twinter, Gimmer, Theave, Hoggerill, Teg, Wether, as applied to older sheep; or again, the terms Kebbet, Guill, Eild, Guest, Shots, Crones, Crocks, as applied to the female sheep. What an inconsistent medley! many of these terms being unknown elsewhere than the locality where they are in common use. I might also instance many absurd names as applied to other animals, *i. e.*, Quey or Whye-calf, Wennel, Weanling, Stirk, Stot, Bud, Burling, Steer, Cuddock, &c., as applied to young cattle; or again, Drape, Dry, Gast, Gelt, Forra, Eild, Lease, Veer, Yule, as applied to cows; the meaning of which is almost unknown out of the respective districts where they are in use. Of horses and pigs I might give equally absurd names, but refer to my synopsis below. I have also thought it not inappropriate to couple with this subject the terms used in the driving and directing horses when in work. These are, if possible, still more unintelligible, not to say barbarous. The only remark I would make upon this point is, that it is highly important that one set of terms only should be in use upon the same farm, otherwise the horses are confused by a medley of sounds, and the wondering clodpole is astonished to find the horses do not comprehend him, and therefore frequently lashes them severely for his own fault. I am not about to suggest an alteration of this order of things by Act of Parliament, as in the agitation of the subject relating to weights and measures; but I would suggest a more uniform adoption of the best and most suitable terms by every intelligent agriculturist, by every agricultural writer, and by every agricultural journal or report. In this way, by continued perseverance, much may ultimately be done, and, as the intelligence of farmers is promoted, such relics of the olden time will fall into disuse. If I am asked who is to decide the precise terms to be adopted, I would reply that our great agricultural societies have mainly settled that question in their programmes and prize sheets. These terms I would adhere to with great pertinacity, so far as they are applicable: the many minor ones will, I think, eventually follow.

The following imperfect synopsis is taken from various sources:—

1st.—Names and designations relating to sheep, as used in different districts.

The male sheep is called a ram and a tup, almost universally.
The female sheep—a ewe (often pronounced yoe), almost universally.
The male lamb—a ram-lamb, a tup-lamb, weder-lamb, generally; and a pur-lamb, in the West of England.
The female lamb—a ewe-lamb, a sheder-lamb, very generally; a gimmer-lamb, in Scotland and the North of England; and a chilver, in the West of England.*
The male at one year—a lamb-hog, hog, a tup-hog, hogget, hoggerill, wether-hog, teg.
The female at one year—a ewe-hog, a gimmer-hog, a ewe-teg, a sheder-hog.
Lambs brought up by hand—a cade-lamb, in Lincoln, &c.; and a tiddlin, in Wilts, Gloucester, &c.
The male at one and two years—a shearling, a shearing, a shear-hog, a shearling-wether, shearling-tup; a dinmont, in Scotland; and a twinter, in Stafford and North of England.
The female sheep at one and two years—a shearling-ewe, a two-toothed-ewe, a theave, a gimmer, a gimber.
Older sheep—a two-shear, a four-toothed, or a three-shear, a six-toothed-ewe or wether.
The female missing lambing—a barren-ewe, guile-ewe, eild-ewe, guest-ewe, tup-yeld-ewe.
The female having slipped her lamb—a kebbit ewe, cast-ewe.
Aged and rejected females—a cull-ewe, cast-ewe, shots, crones, crocks.

2nd.—Names and designations relating to cattle as used in different districts:

The male is called a bull, quite universally, *i.e.*, short-horned bull, Devon bull, Hereford bull, &c., &c.
The female—a cow, quite universally, short-horned cow, Devon cow, Hereford cow, &c., &c.
The male calf—a bull calf.
The female calf—a heifer calf, a quey calf, a whye calf.
The male castrated calf 1½ years—a yearling, a stirk, a weaned calf, a weanling, a burling, a bud, a stot.
The female calf 1½ years—a yearling heifer, weaned heifer, wennel heifer.
The male above 1½ to 3 years—a steer, a ha a hi (Scotland), two-year-olds, three-year-old steers, cuddocks.
The female above 1½ to 3 years—a heifer, a two-year, or a three-year-old heifer.
The barren female—a dry cow, eild cow, forra cow, drape cow, gast cow, gelt cow; or having missed calf, lease cow, veer cow, yule cow.
Cattle not having horns—a coost ox, dodded ox, hammelled cow or ox, moiled cow or ox, muil cow, mullock cow, not cow, powley cow or ox.

3rd.—Names and designations relating to horses as used in different districts:

The male is called a horse, a stallion, a coosar, a stoned horse, an entire horse.
The female—a mare, a nag mare, a cart mare, &c.
The young male—a colt foal, a yearling colt, a hog colt, a stag colt, a two-year-old colt, a three-year-old colt, a four-year-old horse, a gelding.

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* I have not named a tithe of the districts where many of the same terms are in common use, nor have I enumerated all the names so used.

The young female—a filly-foal, a yearling-filly, a two-year-old filly, a three-year-old filly, a four-year-old mare.

4th.—Names and designations relating to pigs, as used in different districts:

The male is called a boar, a brawn, a hog-pig.
The female—a sow, a yilt.
The young male, castrated—a store pig, a gure, a shot, a yolk
The young female, spayed—a spayed sow, a clean cut sow, a sow pig.
The young female—a gilt, a young sow, a hilt, a gelt.
The birth of pigs—a litter of pigs, a fare or farrow of pigs, a farth of pigs, and pigging.
The smallest of the litter—a reckling, a krute, a rut.
The general terms are—bacon pigs, porkers, breeders, store pigs, grunters, piglings, &c.

5th.—Terms used in different districts in driving and directing horses in work, &c.:

To the right.	*To the left.*	*To go on.*	*To stop.*	*To hold back.*
Hupp!	Hie!	The name of horse.	Wo!	Hoi back!
Gee!	Come ather!	Gehup!	Whoi!	Con back!
Haup!	Wynd!	Go on!	Stand!	Hold back!
Hep!	Vane!	Coupeoep!	Who-ho!	Woa-back!
Weeoh!	Vine!	Gee!	Whoi and the name.	Back!
Gee back!	Half!	Iaht!	Wey!	
Gee-ho or woa!	Half back!		Woa!	
Height or Hoite!	Woa back!		Woi-ope!	
Woot!	Come agin!		Holt!	
Gee woot!	Haw!			
Woag!	Hauve!			
Woi-hi!	Coom-yeh!			
	Woi!			
	Hauve woi!			
	Come hither!			
	Aue-woi!			

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE NECESSITY OF A UNIFORM SYSTEM IN THE SALE OF CORN.

The first monthly meeting of the members of the Club, for the present year, took place on Monday evening, February 1st, at the Club-House, New Bridge Street, Blackfriars.

Mr. Thomas Owen, of Clapton, Hungerford, Berks, presided as Chairman for the new year, supported by Messrs. H. Trethewy, J. Marshall, Owen Wallis, S. Skelton, B. P. Shearer, R. Baker, T. C. James, N. G. Barthropp, J. B. Spearing, C. Howard, W. Gray, J. Wood, J. Wood (Croydon), J. Cressingham, Robert Smith, E. Little, G. Smythies, W. Bullock Webster, H. Shotter, T. Congreve, M. Reynolds, J. L. Morton, L. Pearman, J. Tyler, John Thomas, G. S. Harrison, S. Sidney, J. Marsh, junr., H. H. Tatam, W. Eve, W. Cheffins, T. Hammond, J. G. King, C. Gorton, W. Brown, E. B. Acton, T. G. Dagg, &c., &c.

Mr. Owen Wallis, of Overstone-Grange, Northampton, undertook to introduce the subject for discussion:—"The necessity of a uniform system of weights or measure, in the sale of corn and other agricultural produce, throughout England and Wales."

The CHAIRMAN said, in occupying the chair for the first time, he begged to ask the indulgence of the Club, while he continued to preside over its proceedings; and he hoped he need scarcely say that he should use his best endeavours to promote the interests and prosperity of the Club (cheers). He trusted that the discussion of that evening would be carried on in that friendly spirit which had hitherto marked their proceedings. The subject on the card was one of great interest, not only to the Club, but to the community at large, and he hoped that they would be enabled to arrive at a decision which would guide the Legislature in a matter in which some alteration had long been required. He would now introduce Mr. Wallis, who would proceed to open the discussion, only adding, in conclusion, that he felt great diffidence in filling the chair which had been, during the last year, so ably occupied by that gentleman; but that he hoped, with the support of the members of the Club, to be enabled to perform in a satisfactory manner the duties which had devolved upon him (cheers).

Mr. WALLIS then rose and said: In appearing before you again at so early a period after quitting your chair, I feel that some explanation, if not apology, is necessary. On several occasions after our discussions last year, I called the attention of the Club to the anomalies existing in the weights and measures by which corn is sold in the different markets of the kingdom. My object in doing so, I need scarcely say, was to enlist the co-operation of this influential body; and by means of the publicity given to its proceedings in the agricultural press, to call the attention of the farmers, corn merchants, and millers to the evil, and by their united means ultimately to procure a remedy. A good deal of discussion ensued, and a committee was appointed to consider what steps should be taken by the Club in reference to the subject. At our meeting in June, it was thought very desirable to obtain the opinions of the public on so important a matter; and, with that view, a circular letter was placed at the head of the report of the discussion for that month, and in that way sent to the members of the Club. It was also forwarded in another form to all the boards of guardians, district farmers' clubs, and chambers of commerce in the kingdom, and replies to the questions contained therein requested. To this letter numerous answers have been received; and it was thought desirable that the substance of the opinions thus collected should be brought before the Club in a condensed form, and the whole subject again discussed, not incidentally, as during last year, but primarily, in order that a full report of the views and opinions of the Club may be circulated throughout the country. Having been instrumental in bringing the subject to your notice, I was requested to introduce it on this occasion; and though I felt assured that there were many members of your body more competent than myself for the task, I felt that I ought not to refuse, and thus impose upon another a duty I had myself declined. It was also thought desirable that the discussion should precede the regular meeting of Parliament, in order that the conclusions at which we may arrive should receive any consideration they may deserve, in case a measure for the establishment of a uniform standard of weights or measure for the sale of corn and other agricultural produce should be introduced in the House of Commons during the coming session. On that account it was placed first on the discussion card for the year, and it is for that reason I again appear so quickly before you. In accordance, therefore, with the expressed wishes of this Club, I have placed in a tabular form, which will be printed with this paper, the opinions of the different gentlemen who have been good enough to reply to our questions, and I pledge myself that they are, as far as I can gather them, a faithful transcript of those opinions (see pages 200 and 201).

Names of Clubs and Boards of Guardians.	For perfect uniformity.	To be made compulsory.	Will co-operate with Central Farmers' Club.	For Imperial Measure only.	For Weight only for all Corn.	For Measure with natural Weight stated.	Weights of Corn per Bushel.							Opinions expressed in the Returns to which they have reference.
							Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.	Tares.	
							lb.	lb.	lb.	lb.	lb.	lb.	lb.	
Members of Central Farmers' Club.....	4	4	1	4	3	1	—	—	—	—	—	—	—	Eight members made returns, but I have not thought it right to state names.
Arundel Farmers' Club	1	1	—	—	1	—	60	—	—	—	—	—	—	Weight the only criterion of value.
Bakewell ditto	1	1	1	—	1	—	—	—	—	—	—	—	—	All corn by the stone of 14 lb.
East Berwickshire ditto................	1	1	1	—	—	1	—	—	—	—	—	—	—	
Devonshire Agricultural Society........	1	1	1	—	1	—	60	52	38	—	—	—	—	
Hexham Farmers' Club................	1	1	—	—	—	1	—	—	—	—	—	—	—	
Howden ditto	1	1	1	—	1	—	—	—	—	—	—	—	—	Uniformity for all agricultural produce.
Hawick ditto	1	1	1	—	—	1	—	—	—	—	—	—	—	Desire that cheese may be sold by the cwt. of 112 lb., instead of 120 lb.
Keele ditto	1	1	1	—	1	—	62	51	40	—	—	—	—	Uniformity for all agricultural produce.
Kelso ditto	1	1	1	—	—	1	—	—	—	—	—	—	—	Request to be furnished with a copy of any Petition to Parliament agreed upon.
Louth ditto	1	1	1	—	1	—	60	54	38	—	64	64	64	Recommend uniform weights for wool, meat, &c. The stone varies in different markets from 8 lb. to 18 lb.; the lb. from 12 oz. to 18 oz.; various other weights in use.
Penrith ditto................	1	1	1	—	1	—	63	54	42	61	—	—	—	
St. Peters ditto	1	—	—	1	—	—	—	—	—	—	—	—	—	Advise that all grain shall be sold by one weight. Advocate decimal weights.
Staindrop ditto	1	1	—	—	—	—	—	—	—	—	—	—	—	Object to weight altogether.
Sittingbourn ditto	1	1	1	1	—	—	—	—	—	—	—	—	—	Are obliged by the opportunity of expressing their opinions.
Tetbury Agricul. Improvement Society..	1	1	1	—	1	—	60	50	40	—	65	60	60	
Wenlock Farmers' Club	1	—	—	1	—	—	60	58	40	—	—	—	—	Or, wheat 18 stone, barley 15 st., oats 12 st., and beans and peas 19 st. per sack.
Wirksworth ditto	1	1	1	—	1	—	63	52½	42	—	66½	66½	—	Impossible to enforce sales by the imperial bushel.
Wingworth Agricul. Implement Society..	1	1	1	—	1	—	63	54	42	—	—	—	—	
Farmers living near Thirsk	1	1	1	—	1	—	62	55	40	—	66	—	—	Suggest 100 lb. as a weight for the sale of all corn and other agricultural produce.
Wirral Agricul. Improvement Society ..	1	1	1	—	1	—	—	—	—	—	—	—	—	
Totals	20	18	15	8	12	4	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	
Average weights	—	—	—	—	—	—	61 5	52 11½	40 3½	61 0	65 6	63 5	63 0	
Arlesford Union	1	—	—	1	—	—	—	—	—	—	—	—	—	
Berkhamstead................	1	—	1	1	—	—	—	—	—	—	—	—	—	
Bingham	1	1	1	—	1	—	63	54	42	—	66½	66½	66½	Say that to sell by measure and state the weight, is in effect to sell by weight.
Billesdon	1	1	1	—	1	—	63	54½	42	—	66½	—	—	
Bridgenorth	1	1	1	—	—	1	—	—	—	—	—	—	—	
Bridlington	1	1	1	—	1	—	61½	52½	42	—	63	63	63	
Beverley	1	1	1	—	1	—	63	56	42	—	63	63	63	Without going into particulars, are unanimously of opinion that the present system is calculated to impede commerce.
Bury St. Edmunds................	1	1	1	—	—	—	—	—	—	—	—	—	—	
Bala	1	1	1	—	—	1	—	—	—	—	—	—	—	Concur in the views of the Club.
Brierley (North)	1	—	—	—	—	1	—	—	—	—	—	—	—	
Chesterfield	1	1	—	—	—	1	—	—	—	—	—	—	—	
Cheadle	1	1	1	—	1	—	60	50	40	—	60	60	60	
Cathrington	1	—	—	1	—	—	—	—	—	—	—	—	—	For fixed weights.
Cardiff	1	1	—	—	—	1	61	51	38	—	—	—	—	Potatoes are sold at 84 lb. per bushel.
Dolgelly................	1	1	1	—	1	—	63	55	42	—	—	—	—	Resolved, that it is desirable that all agricultural produce should be sold by the cwt.
Derby (West)	1	1	1	—	1	—	—	—	—	—	—	—	—	For the imperial bushel, without weight.
Eastry................	1	1	—	1	—	—	—	—	—	—	—	—	—	To sell by weight, but state weight, and sell by specified weight.
Easingwold	1	—	—	—	—	1	—	—	—	—	—	—	—	

Feversham	1	—	—	1	—	—	—	—	—	—	—	—	—	
Goole	1	—	—	—	1	—	63	—	—	—	—	—	—	All agricultural produce to be sold by weight.
Grantham	1	1	—	—	1	—	62	55	—	—	—	—	—	Unanimous for weight, and Chairman thinks these weights proper.
Hardingstone	1	1	—	—	1	—	60	52	39½	—	64	62	62	For standard weights in lieu of measure.
Kingsbridge	1	1	1	—	—	1	58	50	37	—	—	—	—	
Kington	1	1	1	—	1	—	60	53	39	—	—	60	—	Decidedly for weight, in preference to measure.
Keighley	1	—	—	—	1	—	—	—	—	—	—	—	—	Decidedly of opinion that weight should be adopted.
Kings Norton	1	1	1	—	1	—	—	—	—	—	—	—	—	Weights only, and those decimal. Great inconvenience of different weights for [same commodities.
Lewes	1	1	—	—	1	—	—	—	—	—	—	—	—	Measures of weight for each corn.
Lancaster	1	1	1	—	1	—	60	50	36	—	—	—	—	For selling solely by weight.
Loddon	1	1	—	—	—	1	—	—	—	—	—	—	—	Think the coomb of 4 bushels best, with natural weight stated.
Mansfield	1	—	—	—	1	—	63	55	39½	60	66½	66½	66½	Unanimously for weight.
Manchester	1	—	—	—	—	—	—	—	—	—	—	—	—	Resolved, that it is highly desirable to establish uniformity.
Malmsbury	1	1	—	—	—	1	—	—	—	—	—	—	—	
Newhaven	1	—	—	—	1	—	—	—	—	—	—	—	—	In favour of weight, as less liable to dispute than measure.
Newport Pagnell	1	1	1	—	1	—	60	52	38	62	65	62	62	
Newport (Shropshire)	1	—	—	—	—	1	62	57	42	—	—	—	—	The Chairman has taken the opinions of other farmers, and all agree for weight.
Pocklington	1	1	—	—	1	—	63	56	38½	56	66½	63	63	
Pickering*	1	—	—	—	1	—	70*	56	42	—	70	—	—	Fixed weights at all times preferable to measure.
Prescot	1	1	1	—	—	—	—	—	—	—	—	—	—	Greatly inconvenienced by different weights being used. Potatoes sold at 80, 84, [and 90 lb.
Rugby	1	1	—	—	1	—	63	54	41½	—	65	65	—	
Rhayader	1	1	1	—	1	—	—	—	—	—	—	—	—	Desire that wool and potatoes should be sold by a uniform weight.
Ruthen	1	1	1	—	1	—	60	50	40	—	65	65	—	Unanimously for weight, as most satisfactory.
Ross	1	1	—	—	1	—	—	—	—	—	—	—	—	Object to measure.
Rye	1	1	—	1	—	—	—	—	—	—	—	—	—	Imperial bushel only.
Shoreham	1	1	1	1	—	—	—	—	—	—	—	—	—	Imperial bushel only.
Swansea	1	1	1	—	1	—	60	58	38	—	—	—	—	For sale by weight only.
Saffron Walden	1	—	—	1	—	—	—	—	—	—	—	—	—	Measure only.
Southam	1	1	—	—	1	—	—	—	—	—	—	—	—	
Stour	1	1	1	—	1	—	60	50	40	—	60	60	60	
Settle	1	—	1	—	—	—	—	—	—	—	—	—	—	Uniform system absolutely necessary.
Selby	1	—	—	—	1	—	63	56	38	60	70	70	70	
Stonehouse	1	1	1	—	1	—	—	—	—	—	—	—	—	Against any measure.
St. Albans	1	1	1	1	—	—	—	—	—	—	—	—	—	Measure without weight.
Spalding	1	1	1	—	1	—	60	52	37	—	66	63	—	Don't approve of weight and measure combined.
Heo	1	—	1	1	—	—	—	—	—	—	—	—	—	Measure only.
Tamworth	1	1	1	—	1	—	63	53	42	—	65	65	—	A uniform system of weights should be established throughout the Kingdom.
Thame	1	1	—	—	1	—	62	53	36	60	65	63	64	
Weatley	1	1	1	—	1	—	60	—	—	—	—	—	—	For weight only.
Wrexham	1	1	1	—	1	—	60	50	38	—	65	65	—	For measures of weight only.
Wem	1	1	1	1	—	—	—	—	—	—	—	—	—	For imperial bushel without weight.
Whitehaven	1	1	1	—	1	—	—	—	—	—	—	—	—	Weight without measure.
Whitchurch	1	1	—	1	—	—	62	55	40	—	60	60	60	
Wandsworth	1	1	—	—	—	—	—	—	—	—	—	—	—	Think that compulsory uniformity should be established.
Yeovil	1	1	1	—	1	—	60	56	40	56	63	62	63	
York	1	1	—	—	—	—	—	—	—	—	—	—	—	
							Average Weight per Bushel.							
							lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	
Results of the returns of the Unions	64	47	33	12	36	10	61 4	52 13½	41 1	59 0	64 12	63 6	63 4	
Do. of Local Farmers' Clubs	20	18	15	3	12	4	61 5	52 11½	40 3½	61 0	65 6	63 8	63 0	
Do. of Central Farmers' Club	4	4	1	4	3	1	—	—	—	—	—	—	—	
Total results	88	69	49	19	51	15	61 4½	52 12½	40 10½	60 0	65 1	63 7	63 10	These averages are very nearly, but not strictly correct.

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* In taking the averages of weight at which wheat has been returned, I have not included this return. It has doubtless been given as a customary weight, and not as fairly representing the average weight of an imperial bushel.

The returns are from eight members of this Club, twenty local farmers' clubs and agricultural societies, and sixty-four boards of guardians; and on reference to column No. 1, it will be seen that there is an entire unanimity as to the desirability of abolishing the great diversity of weights and measures at present existing, and of establishing a uniform standard. This, though very gratifying, is only what might have been expected. Indeed, the present system is altogether indefensible; and it seems perfectly marvellous that it has been tolerated so long. Time has been, when this mystification of the many was doubtless to the benefit of the few. That, however, has already passed, or is rapidly passing away; and as all concerned are inconvenienced, and very few profit by it, the desire for an entire change is rapidly gaining ground. It seems almost needless to dwell on this part of the subject, further than to place on the records of the Club a list of weights and measures by which corn is sold; and if it is instrumental in bringing about their destruction, and in establishing one only as a standard, it will not have existed in vain. The measures for wheat are as follows: The last of 10 qrs.; the load of 5 qrs., 5 bush., and 3 bush.; the quarter of 8 bushels; the coomb of 4 bushels; the bag of 3 bushels; the boll of 4 bushels and 2 bushels. The weights for wheat are as follows: The bushel of 80lb., 75lb., 72lb., 70lb., 67½lb., 65lb., 64lb., 63lb., 62lb., 61lb., and 60lb.; the load of 488lb., 280lb., and 261lb.; the boll of 240lb.; the bag of 12 score, 11 score and 10lb., 11 score and 4lb., and 11 score; the barrel of 288lb.; the windle of 220lb.; the hobbit of 168lb.; also by weight of 40 stone, 36 stone, 20 stone, and 14 stone; also by 480lb., 224lb., 190lb., 140lb., and 112lb. The measures for barley are—the quarter of 8 bushels; the coomb of 4 bushels: the bag of 3 bushels; and the bushel of 39 quarts and 38 quarts. The weights for barley are—416lb., 112lb.; the boll of 320lb.; the barrel of 224lb.; the hobbit of 147lb.; 32 stone, 30 stone, and 12 stone; the bushel of 60lb., 56lb., 54lb., 52½lb., 50lb., 40lb., and 38lb. Oats are sold by the qr. of 8 bushels; the bag of 3 bushels; the load of 196 quarts and 192 quarts: also by the following weights—The boll of 264lb.; the load of 240lb.; the barrel of 196lb.; the hobbit of 105lb.; the bag of 8 score; the cwt.; the stone; and the bushel of 45lb. and 40lb.; and by 24 stone. Beans by the qr. of 8 bushels; the load of 5 bushels, and of 144 quarts; and the bag of 3 bushels: also by the following weights—320lb., 280lb., 220lb., and 112lb.; by 10 score; by 38 stone; the windle of 220lb.; and the bushel of 66lb. and 63lb. Peas by the qr. of 8 bushels; the bag of 3 bushels; the bushel of 63lb.; and the boll of 280lb. Rye by the qr. of 8 bushels, and the bag of 3 bushels; and by weight of 320lb. Tares by the qr., the bag, and the bushel. Flour is also sold by the sack of 280lb.; the pack of 240lb.; the barrel of 196lb.; and the stone of 14lb. Indian meal by the load of 240lb., and the barrel of 196lb. Oatmeal by weight of 240lb. and 112lb. Indian corn by the qr. of 8 bushels; and by weight of 480lb. and 180lb. Malt by the qr. of 8 bushels, and the load of 6 bush. Such are the weights and measures by which corn, meal, and malt are now sold in the different markets of the United Kingdom, as far as I have been able to ascertain them; but there are, doubtless, many others. Those enumerated amount to a goodly number, being, for wheat alone, no less than 41; for barley, 20; oats, 14; beans, 13; peas, 4; rye, 3; tares, 3; Indian corn, 3; malt, 2; flour, 4; oatmeal, 2; and Indian meal, 2. They are, as a whole, a disgrace to the country in which they exist; and I hope shortly to hear the last of them, except as historical curiosities. I am not acquainted with the weights and measures of other civilised countries, but should fancy that ours can have no parallel. We have so far considered the question as effecting corn, meal, and malt only; but there are a host of weights and measures for meat, butter, cheese, potatoes, fruit, hay, straw, &c., alike perplexing and inconvenient, and therefore objectionable. Having pointed out the evils, we must now consider what is likely to be the best remedy; and I hope the members of this Club will be ready and willing to set an example to their brother-farmers and merchants throughout the kingdom, by showing an earnest disposition to submit to a temporary inconvenience in order to attain a great public good. There can be no such changes as that we are now contemplating, without a considerable amount of personal inconvenience; but prices would immediately adjust themselves to any given standard, and in a very short time we should find the new one quite as convenient as the old: and, by being of general, instead of only local use, it would be infinitely more satisfactory. The greatest obstacles to be contended with will be local prejudices. Each district thinks its own custom the right one, and makes a desperate stand for its retention. There are, as I have shown to you, more than forty different weights and measures in use for the sale of wheat alone; and if there are to be as many battles in the endeavours of each locality to secure the future use of the one it has been accustomed to, how small will be the chances of a beneficial result! Rely upon it, the change at which we are aiming can never be accomplished until those interested in its attainment are unanimous in their desire for it, and ready to make sacrifices in order to obtain it. They must also make that desire known to the Government in terms most unmistakable, for I believe no really beneficial change will ever be made till the Government takes the matter in hand. And now let us consider what that change should be. The first point to be decided is this: Are we to have a measure of capacity? or, are we to have one or more of weight? or are we to have a combination of the two? If a measure of capacity, the imperial bushel will answer every purpose; but if we adopt weight, we shall then have to consider what it shall be, or how far it will be right to use weight and measure together. In our endeavours to select a new standard of measure by which the sale of corn and other agricultural produce shall in future be conducted, we must be especially careful to select one on which perfect reliance can be placed for its unerring accuracy. Unless we do so, no Act of Parliament will ensure its adoption, and no amount of fines make its use compulsory. Now, does the bushel measure fulfil that necessary condition? I say most emphatically that it does not; and hence its use, except in name, is rapidly declining. It is by no means an accurate test of quantity. It was, in times past, the best available measure; but that is no longer the case. Its invention was probably coeval with the flail and the winnowing-fan; and it would be just as wise to revert to those implements for the purpose of thrashing and dressing all the corn we grow, as it will be to continue the bushel measure for the purpose of ascertaining the quantity of it. With the best possible intentions of doing right, the man has never existed who could measure up a quantity of corn with it, however uniform the bulk might be, without their being variations in the weight per sack, when tested by an accurate weighing machine; and it is very easy so to measure it that very large differences will be the result, and yet a person overlooking the operation could make no objection to the measure. In trying the experiment the other day with oats, we made as much as 3½ lbs. per bushel difference, and in no instance could we get two bushels exactly alike in weight. I have been told by a corn-merchant that it is not at all uncommon to have corn delivered varying as much as 7 lbs. the sack of 4 bushels; and hence, I repeat, its almost general disuse. I would not dwell on this point, but from the circumstance that the imperial bushel has still many advocates. Judging, however, from the answers to the circular-letter issued by this Club, they are greatly in the minority, as will be seen by reference to the table of returns which I have drawn up. From this it appears that of the members of this Club four are for measure alone, three for weight alone, and one for measure and weight combined. Of the local farmers' clubs, three are for measure, ten for weight, and four for measure and weight. Of the boards of guardians, twelve are for measure only, thirty-six for weight only, and ten for measure with weight declared. The totals will therefore be—for measure alone, nineteen; weight alone, forty-nine; and measure, with weight stated, fifteen. This last is, in fact, selling by weight; for if the corn which is bought on these terms is delivered in accordance with the weight stated, and of the quality of the sample, no questions are asked as to the correctness of the measure. I contend, therefore, that the advocates of weight alone, and those for measure with weight stated, ought to be added together. The totals will then be 19 for measure, against 64 for weight. If we take this as a fair expression of public opinion—and I think we cannot do otherwise, collected as it is from all parts of the kingdom—the question of measure as against weight may be considered as settled in favour of the latter. We will next consider the propriety of selling corn by measure, but stating its natural weight. That this plan is very convenient to many gentlemen engaged in the corn trade, I have no doubt; indicating, as it does in some degree, the quality of the corn they are buying. But on this point I cannot do better than quote the opinions of the members of the Wirral Agricultural Improvement Society, as expressed in their very valuable report on this subject. They say, "That weight simply, without such an indication of the specific weight as is afforded by a statement of the weight per measure, affords no indication of quality, your committee unhesitatingly admit. But on the other hand, they must affirm that the proper purpose of weight or measure is not, and never has been, to indicate quality; that the mere specific gravity of corn cannot, in an average of cases, be taken to prove its value, in point of quality, within ten per cent; and that, in practice, neither corn nor other agricultural produce is ever bought without being seen and handled, either by the buyer or his agent." In this opinion I entirely concur; and further, I contend that the sellers of corn ought not to be called upon to incur the double expense of measuring and weighing. But there is a still greater objection to this plan. Quotations of prices can never fulfil their proper intention, and be of any real value, till they refer to fixed and definite quantities, and these we can never have with an ever-varying standard. We see a price quoted as to wheat in a distant market, but we do not know whether it has reference to sample weighing 54 lbs. or 66 lbs. per bushel, or any intermediate weight. The quotation is therefore valueless, and that consideration alone is, I think, an insuperable objection to such a standard. This objection applies also, with equal force, to measure without weight. We come last to a standard of weight, and we shall have to consider whether it will be best to have a variety of weights, one suitable to each variety of corn, and fairly representing an imperial bushel of each; or, whether we shall adopt one weight for the sale of all corn and other agricultural produce. If we are perfectly free to choose between the two—and I think it will be found that we are—I am strongly of opinion that it will be much better to adopt one standard than several. As between the buyer and the seller, it must be a matter of perfect indifference what the quantity is, so that it is fully understood; and the more I have thought of the subject, the stronger has become my conviction, that it will be an immense convenience, and greatly to our advantage, to sell all corn and other agricultural produce by one weight only. If corn and meal of all kinds, bran, pollard, oilcake, linseed, locust beans, hay, straw, roots, &c., were each sold by one weight, any one wanting to buy for feeding purposes would see at a glance which was best worth purchasing, without the necessity of troublesome calculations. The adoption of one weight only, is strongly advocated by the Wirral Agricultural Society, the Association of the Liverpool Corn Trade, the Corn Exchange Association of Hull, the Markets Committee of the Town Council of Edinburgh; and I have also received several letters from gentlemen residing in different parts of England, advocating such a standard. Some suggest 100 lbs. as a desirable weight, having in view future decimal weights and measures: others think the cwt. better, having no faith in the establishment of either decimal weights or coinage in our day; and to this opinion I also incline. Having all the necessary weights in use for carrying out a standard of 56 lbs. or 112 lbs., I should prefer one of these, if practicable. It will, I know, be urged that for the purposes of the tithe commutation and the corn rents, it will be absolutely necessary either to adhere to the imperial bushel, or fix upon a standard of weights that will fairly represent it, with respect to each variety of corn. I cannot imagine any great difficulty in this latter point, if fairly and honestly set about. There are numbers of millers who have the weight of every load of wheat they have purchased; and there are corn merchants and others, who can give similar evidence. The weight per bushel being settled—making that the datum for other calculations—I can scarcely think there can be any insurmountable difficulty in preparing a new set of tithe tables, showing what rent-charge shall be paid according to the average price of corn, upon a fixed standard of 56 lbs. or 112 lbs., or whatever it may be. I may possibly be wrong, and we may have to fall back upon weights representing a bushel of each corn. Should this be the case, I think it will be a matter to be regretted; but even that will be an immense improvement upon the present state of things, which I trust will no longer be tolerated. In conclusion, let me urge upon you, and all others, the necessity of thoroughly agitating the question in every part of England, and let each market in England send petitions to Parliament on the subject, or rest assured there will be no beneficial change. Let one and all leave *self* out of the question, not minding a little perplexity in having to sell corn by the cwt., or some other such standard of weight. It has been the custom of Ireland for ages; and what is perfectly convenient there, can be attended with no very great difficulties in England, Scotland, and Wales. With respect to the sale of barley by weight, I will read the following remarks from a correspondent of the *Economist* newspaper: "I perceive with satisfaction that others as well as myself are directing their attention to the fact that corn, like many other commodities, should be sold throughout the United Kingdom by weight alone, and not according to the present system of selling by dry measure. The superiority of the scale, in point of accuracy and impartiality between buyer and seller, cannot be questioned; and the inconsistency of our buying coals, &c., by pounds avoirdupois, and corn by cubic inches, must be equally apparent. Allow me, sir, as one who feels some interest in this question, and who earnestly wishes to see the bushel measure superseded by the scale and balance wherever practicable, to suggest that it would be most desirable for maltsters to buy not only their grain by weight, but that the Excise officers, in computing the duty, should be guided by weight alone—or in other words, that the maltster should be charged according to the weight of raw grain which he intended to use, and not upon the gauge of the malt in the process of making. It is needless to dilate on the justness of such an assessment as I here propose, or to dwell upon the advantages which must result from so fair and simple a practice. The maltster would be spared much vexatious and unnecessary injury to his grain; the Excise officer would be relieved of half his labour and full three-quarters of his vigilance; and her Majesty's revenue be greatly benefited—first, by reason of the extreme simplicity of such a system; secondly, by the ease with which fraud could be prevented and Excise regulations enforced; and thirdly, by the extra amount of duty that would accrue to the Government on a large quantity of lighter barley which would under such an arrangement be certainly made into malt, but which under existing statutes could not be so employed, because it would entail only loss upon the manufacturer. I do not advocate the instant abrogation of the law as it now stands with respect to malting, and far less do I desire to abolish the heavy list of penalties, from which the fair trader has nothing to fear, for it is a protection rather than otherwise; but I think if her Majesty's Board of Inland Revenue could be induced to consider the subject, we might in a short time see maltsters paying their duty by the weight of barley to be wetted, and not by the uncertain and clumsy method of the gauge, and still more uncertain calculations of the exciseman, from whose decision there is little or no appeal." If this view of the question is a correct one, its adoption would be a great boon to the growers of second-rate barley, by causing a demand for it, for malting purposes, which does not at present exist. It has been suggested by the Louth Agricultural Society, and also by others, that this Club should agree upon a petition to the Legislature, and forward copies of it to other agricultural clubs for their adoption and use. I think this a desirable plan. I will not trespass longer upon your patience, further than to again urge the absolute necessity of a general and decided expression of public opinion in favour of the change we are advocating, as the only probable means of its accomplishment. Let me just add, that since I came here this evening I have received a letter from Mr. Bailey Denton, requesting me to call the attention of the Club to the irregularities of measures which prevail with regard to land. I have also received a communication of a similar nature from another gentleman. A land-agent residing in the neighbourhood of Liverpool says that within five miles of his own residence, no less than three kinds of acre measurement, are in common use. First there is the statute acre, of 5½ yards to the rod; next there is the Cheshire acre, of 7 yards; lastly there is the Derby acre, of 8 yards. Of course, such a state of things is very perplexing, and urgently requires attention. Having made these remarks, I sit down, thanking you all for the patience with which you have listened to me (cheers).

Mr. R. Baker (of Writtle) said it could not be disputed that if one uniform system of weight or measure prevailed it would be much preferable to the variety which now existed throughout the kingdom. The question then was, whether weight or measure was the better of the two. Mr. Wallis had argued that if weight were established it would be a criterion of the value of grain that might be estimated by persons at a distance merely reading the report. He (Mr. Baker) differed from that opinion, for this reason, that weight had nothing to do with value; that quality entered more into the computation than either weight or measure, and that whenever a bargain was made the two must always operate upon the mind of the buyer. In Chelmsford market a bushel of wheat was generally estimated to weigh 62 lbs., whether it was red or white wheat, but the value was essentially dependent upon the quality; and there were many instances where wheat, grown in particular districts of the country, invariably made as much as 6s. per qr., or nearly a shilling a bushel, more than wheat which was grown in other districts. Besides, measure had always been the established mode by which corn had been sold in this kingdom for ages past. The Winchester bushel was for a long time the bushel of the country. That was increased to the imperial bushel, amounting to one thirty-second part more, and that bushel was now the standard measure of the kingdom at large. Upon that measure the tithe commutation, corn rents, and duties of import were based; and wherever any other measure existed, whether of weight or capacity, or of weight and capacity combined, it was in contravention of the law of the land. The act of parliament directed that the imperial bushel should be the universal measure; but very unwisely a provision was tacked to one of the clauses, which permitted the continued use of local measures in districts where they had long existed, and exempted them from penalties. This left a loop-hole for employing the measures and weights of various districts, in the same manner as if the act had never been passed; but it was not to be supposed, therefore, that the Legislature would retrace its steps and enact that certain weights, or measures and weights combined, should supersede the measure established by law. With regard to the difficulty of delivering by measure, all he (Mr. Baker) could say was that he himself delivered by measure all the year round, and had never had any complaint from the miller; indeed, there was no reason why there should be, where people were accustomed to put up corn. If a person measured a bushel of oats, as Mr. Wallis had stated, upon a shaky floor in a granary or mill, or did not take due precautions, then it was not improbable that it might make a difference of 3 lb. in the bushel. But it could not alter the quality whether it was sold by measure or weight. He held, then, that every farmer who went into the market could previously ascertain the weight per bushel of the corn he had to sell. It might be thought that that was an advantage which the seller had over the buyer; it was not so, however. Buyers could compute corn to the greatest nicety, as the following anecdote would sufficiently show: A certain miller made a wager that he would compute the weight of a sack of wheat nearer than ten farmers could weigh it, and he won the bet. The fact was, that each farmer weighed it in his own particular way, some with bad scales and others with steelyards, and the results could not be depended upon. The miller's judgment was so good that he computed the weight within 2 lbs., and that was nearer than the farmers could arrive at with their scales and weights. This showed that notwithstanding all the skill that the farmer might possess, the dealer on account of his great practice had an advantage over him in this respect. As representing in that Club the eastern district of this kingdom, where measure of capacity was universally adopted, he felt bound to state that the opinion of the farmers in that district was, that measure was the established principle on which corn should be bought and sold, and that their desire was to continue its use. If the system of weight were adopted, he had no doubt that the farmers of the eastern district would as easily fall in with it, as a farmer of the west could adapt himself to measure; but it should be recollected that they who did not possess weights would have to incur considerable expense in order to procure them; whilst, on the other hand, the purchase of a measure would be a very trifling affair in comparison. The existing law having been enacted so recently, he did not think that any resolution which this Club might come to would induce the Legislature to alter it. In fact, he had arrived at the conviction, after maturely considering the question, that there was no necessity for an alteration, or any reason why the imperial bushel should not be the standard by which all weights and measures of corn should be adjusted (Hear, hear).

Mr. **Skelton** (of Sutton Bridge, Wisbeach) said, having had considerable experience with regard to this subject, both as a farmer and as a corn-merchant—an experience extending over more than 30 years—he was desirous of making a few remarks. The necessity of having a uniform system was no longer disputed; they all felt that the crude and manifold modes of selling corn, which had hitherto prevailed in various parts of the kingdom, required immediate alteration. As regarded the practicability of attaining uniformity, he really saw no insuperable difficulties, though he must admit that penalties were not agreeable either to farmers or to the public at large (Hear, hear). What was spoken of on the card was "a uniform system for England and Wales." He could not understand why Scotland was omitted; in his opinion there ought to be uniformity throughout the kingdom (Hear, hear). Moreover, he thought the principle of uniformity should be applied not only to all the corn grown in the United Kingdom, but also to all the corn imported from abroad, so that the comparative value of the two might be ascertained through the same medium. Mr. Wallis had alluded to the local prejudices which were opposed to any change of the existing state of things. Having a very extensive circle of acquaintance connected with the corn-trade, he had been in correspondence with several gentlemen on the question under consideration, and the result was that persons who had been in the trade many years had pronounced the object almost impracticable. They referred to France, in support of their view, and remarked that in that country the government, notwithstanding all its arbitrary power, had hitherto failed to establish a uniform system. In the opinion of those gentlemen as to the impracticability of the object he did not concur, believing as he did that if the matter were duly discussed, were talked over at market ordinaries, and well considered in private, they would be enabled to arrive at a practical result. He could not help here remarking on the importance of having an amended system of taking the corn averages (Hear, hear). A friend of his, Mr. S. Sandars, who had had a very long and extensive experience in the corn trade, and well up to all the bearings of this subject, had suggested that no buyer should be required to make a return of any corn except that which he had purchased from the grower; the reason given by him for this suggestion being that the same corn had frequently been sold two or three times over, on a market day, the charges upon it being thus considerably increased. Under the existing law, the buyer was compelled to make a return of all the corn bought by him, without reference to the place where it came from, or the expenses which might have been added to it; and this was an important matter for those who had to pay the tithe rent-charge, or corn rents. He trusted that whenever a uniform system of selling corn was established, the subject of the mode of taking the averages would not be overlooked. As regarded the question more immediately before them, it should be borne in mind that the tithe rent-charge was based on returns made by measure, that the corn-rents were based on measure, and that import duties and freights were also founded on the same principle. With respect to weights, he thought it would be very difficult to arrive at a sound conclusion as to what should be the fixed weight for all seasons, for all soils, and for all districts (Hear, hear). They all knew very well that the seasons made a great difference (Hear, hear). In the year 1852, his shipments were generally made at from 57lbs. to 58lbs. per bushel; while in the year 1844, they were made at from 63 lbs. to 64 lbs. Such was the effect of the difference of seasons. Then, again, they all knew that different soils gave different weights; and hence he concurred in the remark of Mr. Baker, that weight did not always represent quality. It was well known that some soils yielded a thin-skinned wheat, which though superior in quality to the coarser wheat of other soils, was not equal to it in weight. He fully agreed with Mr. Baker in reference to the amount of ability and skill displayed by many persons who were engaged in the corn trade as millers and merchants; but he maintained that as it was an object with the seller and buyer to carry on their business to mutual advantage, in order that they might come together a second time, it was necessary when wheat was not in good condition that the seller should name a given weight; otherwise how could the buyer form a correct judgment? It was impossible that he could do so from a sample shown in the market, when the corn was out of condition; and it was but fair, therefore, that in such cases the seller should name a weight. Mr. Wallis had spoken of the double expense of weights and measure. In Norfolk, also around Wisbech, &c., it was the common practice, after the corn was dressed, to order the men to measure four bushels; and the weight of these having been ascertained, no further measuring was required; the farmer went to market, stating that he had so much corn to sell of that given weight. Now, he had received various suggestions with reference to this subject; some to the effect, that corn should be sold by the cwt., others in favour of the imperial measure, and others of a different nature. He should be very glad to see a uniform system, more intelligible and convenient than the present state of things; but the great question was to what it should be. The words on the card were "a uniform system of weight or measure." He should greatly object to the re-opening of the question of the tithe rent-charge, which had been settled to the satisfaction of all parties; and if it were re-opened, there could be no doubt that the clergy would, and he must say very properly, come forward to defend their rights; while many landlords would also become alarmed. His own opinion was that the imperial measure should be retained; but its use should be enforced universally, not only throughout England and Wales, but also in Scotland and Ireland, and that all foreign corn should be included in the operation of the law.

Mr. **Tatam** observed that foreign corn already paid duty by measure.

Mr. **Skelton** continued: His own observation and experience were in favour of adherence to measure; and he would recommend that Parliament should be petitioned to enforce uniformity by the Imperial quarter of 8 bushels.

Mr. G. **Smythies** (Marlow, Leintwardine) said he entirely concurred in the able address of Mr. Wallis; he did not recollect a single word in it from which he dissented. In his own county he was in the habit of attending three markets, and at those three markets he was obliged to sell by different weights. It was all weight, not measure; and from his experience on the subject he was quite sure that in those districts where weight was already established, no legislative enactment for carrying out the principle of measure could be enforced. Weight was so muce preferred to measure by those who had tried it, that he felt certain that the imposition of penalties could never induce those who had habitually used the former to adopt the latter in its stead. He did not believe were a dozen farmers in his district who had there departed from the old system of selling by weight since the last enactment first came into operation; so superior had selling by weight been found in practice to selling by measure. There seemed to be a general desire, not only in that room, but throughout the country, that some uniform standard should be adopted. The question to be determined was what the standard should be; and, as selling by measure had been tried and found wanting, he thought all parties must soon follow the plan of selling by weight. He doubted whether the country was yet ripe for the adoption of either weight or measure as a universal system, but he was confident that the discussion of the subject would ere long lead to a satisfactory decision. Sale by 56 lbs. or 100 lbs. would be a very convenient mode of selling. Either of those weights would form a very suitable load for one man, whereas it was impossible to assert anything of that kind with respect to 4 cwt.

Mr. H. Trethewy (Silsoe, Ampthill) said it appeared that whether they adopted a resolution in favour of weight or one in favour of measure, they would equally offend the prejudices of many districts of the country (Hear, hear). They were told by Mr. Baker that in Essex measure had been adopted and acted upon for many years, and had proved perfectly satisfactory; while, on the other hand, the last speaker said, in effect, that in his part of the country parties would not listen to a proposal to sell by measure. It was quite obvious, therefore, that whatever course might be recommended by that Club, the recommendation would meet with great opposition in certain districts. It was of course very desirable that some specific course should be followed; but he must confess that the question appeared to him an exceedingly difficult one. If they had to start afresh, weight would no doubt be generally preferred to measure, as being the most easy and practicable system; but, on the other hand, when all commercial regulations were, so far as corn was concerned, based on measure, it was extremely questionable whether weight could be universally substituted for it. When this subject was first mooted in the Club, the tithe rent-charge seemed to him to present a great obstacle to any alteration; and the more he had thought on the matter since, the more had he felt the force of that objection. The tithe-rent being based on a bushel of wheat, if the bushel were required to contain so many pounds, in districts where the wheat was light the farmer would have to pay an increased tithe-rent; and, in like manner, the producer who paid a corn-rent might, under certain circumstances, be made to pay a higher rent than the landlord was fairly entitled to receive. These appeared to him very great obstacles to any alteration which was to be carried out everywhere; and he entertained very strong doubts whether the Legislature could be prevailed upon, through any resolution which they might adopt that evening, or on any future occasion, to retrace its steps (Hear, hear). The imperial measure now appeared so natural—all the calculations connected with corn were so much based upon it—that in his opinion it would be impossible to upset it. He cordially concurred in many of the remarks made by Mr. Wallis; but he saw much greater obstacles to the establishment of a uniform system than appeared to have presented themselves to the mind of that gentleman (Hear, hear).

Mr. H. Tatam (Moultan, Spalding) must remind the meeting that the imperial bushel consisted legally of so many square inches of water, which was to be of a certain heat; so that when they went back to the primary state of affairs, they found that a bushel of wheat was constituted by weight. He did not believe there would be any difficulty in arriving at a fair average weight for the whole kingdom, or in prevailing upon the Legislature to establish a uniform system.

Mr. S. Sidney (of Peckham) said there could not be the slightest doubt that the question under discussion involved difficulties, but he saw no reason why they should not attempt to grapple with them. A few years ago every county had a metropolis of its own, and the farmers living in it never dreamt of sending their corn to the London market; but a great change had since occurred, and it was absurd to think of adhering to a system, simply because it had prevailed among their ancestors. Here was corn sold in half-a-dozen different ways in different districts, so that between weight and measure it seemed almost impossible to understand the operations of the corn trade. Under these circumstances the question was, how they could best attain uniformity. They certainly could not attain it by each dwelling on the particular plans followed in their respective counties, and contending that theirs was the only plan that could be carried out universally (Hear, hear). It was an important fact, that wherever a tendency had been exhibited towards change, it had been in the direction of weight (Hear, hear). That was a fact which the advocates of measure could not deny, and the inference from which was obvious. They had before them, as it were, that evening, the measure system on the one side, and the weight system on the other; and he hoped they were not going to separate without having taken a step towards telling the Legislature which of these systems they thought best for the whole country (Hear, hear). They might depend upon it that if they did not contribute to the settlement of the question, it would be settled without them. No one could imagine that the present absurd state of things would continue very long. If a resolution were adopted in favour of some uniform system of weights, the wide extension of the educational movement would secure the requisite knowledge for carrying it out in the schools scattered throughout the country.

Mr. Thomas (Bletsoe, Bedfordshire) said he regarded the question under consideration as a question of weight or measure. He entirely concurred in the remark that from 2 lbs. to 3 lbs. more or less might be put in a bushel by one person than by another, according to the mode in which the thing was done; and, when that was the case, why, he asked, should the imperial bushel be adhered to? For a considerable time he was not able to deal with a particular miller, because the miller said his bushel was not large enough (great laughter). Under these circumstances he offered to send his bushel to the county town, to be tried by the regular tester, with the condition that he should forfeit £5 if it were not true, and the further condition that the miller should send his bushel also to be tested, and forfeit £5 in case that were found defective. In point of fact, he sent his own bushel, and it proved to be perfectly correct. The miller then refused to imitate him in that respect, and the dispute was terminated over a bottle of wine. It was then agreed between them that his (Mr. Thomas's) bushel should in future represent a certain weight; and after that principle had been adopted, he sold to his friend a large quantity of corn, and they went on very amicably. He mentioned this merely to illustrate the difficulty there was in always making the same weight with the imperial bushel

(Hear, hear). He found that there were variations in the sacks, which sometimes amounted to as much as two or three pounds. He maintained, therefore, that the imperial bushel was not a fair standard, and that there should be some weight to represent the imperial bushel, as nearly as possible, throughout England and Wales, and also throughout Ireland and Scotland. It was admitted, he thought, on all hands, that there was no fairer test than dead weight. Why, then, should not the imperial bushel be represented by a certain dead weight? Whether the standard weight should be sixty, sixty-one, sixty-two pounds, or more, was of course a matter for consideration; but he thought that, on an average of years, sixty pounds would be found the nearest to the mark. Since the subject was discussed last year he had taken the trouble to make inquiries of his neighbours, and of other persons in various localities, as to their opinions in reference to this matter, and he found that a decided majority of them were in favour of having some uniform weight, representing as nearly as possible the imperial bushel. He quite agreed with Mr. Wallis, that this difficulty of ascertaining the value of wheat, from the quotations of customary local weights or measures, was ordinarily far greater in the case of the farmer than in that of the corn-merchant and the miller. The latter always had their Ready-reckoners with them, and could soon arrive at a correct estimate of value—a matter often of considerable difficulty to the producer. For these reasons, he was of opinion that the establishment of a uniform weight would be the best settlement of this vexed question.

Mr. Dagg (Hatfield, Herts) observed that, with the exception of the last speaker, no person who had taken part in the discussion had stated whether he had himself bought or sold by weight or by measure. When he first went to Mark Lane to buy corn, he asked the weight per bushel, but could never get any one to tell it; and this was an impediment to transactions. For the last seven years he had never bought in any way except by measure, with a guaranteed weight; and he was of opinion that measure should be retained, it being left to the buyer and seller to make their own bargain with respect to weight (Hear, hear). In fifty quarters of oats he had deducted as much as six shillings and sixpence for sixty-six pounds of deficient weight. The Norfolk plan seemed very fair dealing, and on the whole, he thought the use of the imperial bushel, accompanied with a guaranteed weight as between buyer and seller, was the best system that could be adopted; and he believed that, practically, such a system would not interfere with the tithe rent-charge, the duty on importations, or any existing arrangement.

Mr. Little (Landhill, Chippenham) said, having adopted the plan just described by Mr. Dagg, he begged to say he had found it very advantageous to him as a farmer. In his own county—Wiltshire—it was very much the practice for farmers to combine a guaranteed weight with the imperial bushel, and it was a practice which had generally proved very satisfactory to all concerned. He really believed that it was the best system that could be established as a uniform system, and the best compromise that could be effected.

The Rev. C. T. James said it was important to remember that the tenor of the act of Parliament was decidedly against weight, and in favour of measure. It was only by an *addendum*, as it were, to the act—an *addendum* which seemed to have been introduced inadvertently—that farmers were enabled to sell by weight. He should be heartily glad, if it were practicable, that all corn was sold by weight, because in the arrangement of our animals, we should then more largely feed by weight; but he could not overlook the manifest intention of the Legislature. The 5th and 6th Will. IV. abolished the use of all local and customary measures. This was done in the 6th clause, as follows: "And be it enacted, That from and after the passing of this Act the Measure called the *Winchester* Bushel, and the Lineal Measure called the *Scotch* Ell, and *all local or customary Measures, shall be abolished;* and every person who shall sell, by any Denomination of Measure other than One of the Imperial Measures, or some Multiple or some aliquot Part, such as Half, the Quarter, the Eighth, the Sixteenth, or the Thirty-second Parts thereof, shall, on Conviction, be liable to a Penalty not exceeding the Sum of Forty Shillings for every such Sale." Those words he could easily understand. But then came a proviso in the same clause, which was inconsistent with what preceded it: "Provided always, that nothing herein contained shall prevent the Sale of any Articles in any Vessel, where such Vessel is not represented as containing any Amount of Imperial Measure, or of any fixed, local, or customary Measure heretofore in use." Thus the second part of the clause nullified the first, and gave a sanction to selling by weight, which was not contemplated, probably, when the act was passed. The 8th clause, which was also a very important one, was as follows: "And whereas some Articles heretofore sold by Heaped Measure are from their Size and Shape incapable of being stricken"—the use of the word "stricken" was very significant, as showing that Parliament intended all sales to be made by measure—"and from their Nature and Quality may not be conveniently sold by Weight: Be it therefore enacted, That all such Articles may henceforth be sold by a Bushel Measure," &c. Again, in the 16th clause, Parliament said: "And be it enacted, That in *Scotland*, from and after the passing of this Act, the Fiar Prices of all Grain in every County shall be struck by the Imperial Quarter, and all other Returns of the Prices of Grain shall be set forth by the same, without any Reference to any other Measure whatsoever; and that any Sheriff Clerk, Clerk of a Market, or other Person who shall offend against this Provision shall forfeit a Sum not exceeding Five Pounds." Notwithstanding this enactment, the greatest diversity still prevailed in Scotland. He (Mr. James) had himself resided and occupied land within reach of four market-towns, in every one of which a distinct system of purchase and sale prevailed. Such diversity was very inconvenient and injurious to the seller, was very perplexing to the merchant, was fraught with evil consequences to the miller and the baker, and was in numerous instances very unjust and distressing to the hard-working and meritorious poor (Hear, hear). He held in his hand a letter from a miller, which appeared to him deserving of attention. The writer said: "There is a general complaint that farmers do not deliver as sample. Wheat weighs from 65 to 52lb. per bushel; and, in consequence of its being *made* a certain weight, it is impossible to discriminate. The buyer is deprived of the *best guide*, the *natural weight*. The argument that disputes would arise, is not a business view of the question: we have abundant cause of dispute now. It is evident that bargains by weight make the seller careless and the buyer less strict. If the seller deliver the bulk inferior to sample, of course the buyer is prejudiced. It is most decidedly an indirect permission to do so, if the corn is made a certain weight: it is a premium for slovenly management. I see farmers generally make the sheaves too large; and in two or three days, the corn is removed to the barn or rick. The consequence is, the first six months after harvest, English wheat will not make a good sack-flour; and millers are obliged to have recourse to strong Baltic or other foreign wheat, at a cost of generally 5s. to 15s. a quarter more than home-grown. The winnowing also is generally very carelessly done. Now, I believe this carelessness is induced in a great degree by the *selling by weight*, which I, therefore, protest against as an injury to the miller, more so to the baker and the public, and a national disadvantage. The imperial bushel, with a guarantee of the natural weight, is the best guide; and if the weight is not stated, we use our judgment; and, if foolish enough to overestimate the quality or weight, it is no fault of the seller. We should then buy inferior quality at its relative value; and the tithe would be fairly charged, with a uniform measure throughout the kingdom." In these remarks he entirely concurred. In conclusion, he would observe that, so long as such an anomalous clause as the 6th clause of that act continued on the statute-book, there could be no uniform system; and, in his opinion, they should, at all events, petition the Legislature not to continue to stultify itself by a clause so inconsistent with the manifest intention of the act.

Mr. Acton (of the Temple) said, there could be no doubt from the turn the discussion had taken that measure was the prominent mode of selling corn in the Eastern and Western counties, whilst weight seemed to prevail in the Northern and Midland districts, and although he agreed with Mr. Sidney that there ought to be some uniformity in London to guide other markets, owing to the rapid advances of steam transit, he should vote with Mr. Baker and the *wise men from the East* for an improved measure. We had lately heard much of one great social evil, which was very difficult to deal with; but not so with another one which hinged on this question, viz., the prostitution of common honesty towards the poor and needy, in many of the districts around London, and especially in the one he resided in—Camberwell. Now, if a deputation went up to the Government in this matter, he would suggest that a more general supervision of weights and measures should be enforced than at present, and that the fair day's wages for a fair day's work which that Club wished to enforce, should not be frittered away by the iniquities which now daily took place in poor neighbourhoods.

The Chairman said he had only a few words to offer in closing the discussion. Like Mr. Baker, he was very sorry to differ from his friend Mr. Wallis; but he must declare that he was certainly in favour of measure which had prevailed in his own county (Berkshire) for a very long period. He had no wish, indeed, to deny that what Mr. Skelton advocated, namely, measure with a guaranteed weight, might be an improvement on measure alone, and he thought such a system would be generally acceptable in his own county. Having, however, made numerous inquiries in the district to which he belonged, he was convinced that while there would be no objection to the system which Mr. Skelton advocated, there would be the stongest objection to the simple use of a standard weight. Not only are the tithe rent-charge and corn rents, but all the valuations which took place throughout the country were based on measure, not on weight; and he was sure that valuers would have the greatest difficulty in arriving at correct conclusions if weight were substituted for measure. Moreover thrashing and other operations of the farm were regulated by measure; and he thought the establishment of measure as a universal rule would interfere far less with all existing customs than the establishment of a standard weight. He quite agreed with preceding speakers as to the desirableness of adopting, if practicable, some uniform standard for the sale of corn (Hear, hear).

Mr. Wallis then replied: Notwithstanding, he said, all that he had heard to the contrary that evening, he was still of opinion that weight was far preferable to measure as a uniform system; and if there were to be any change at all, it was of course desirable that it should be a change to the best system that could be adopted. The majority of persons interested in the matter were manifestly in favour of weight, which was in very many places entirely superseding measure. What Mr. Skelton advocated was, in fact, selling by weight.

Mr. Skelton observed that it was a uniform weight that he objected to.

Mr. Wallis continued: The bushel varied with almost every sample; and to call it a standard, therefore, was altogether a mistake. It was quite certain that the country could not now go back from weight to measure, and therefore if there were to be a uniform system it must be based on weight.

Considerable discussion ensued as to the form in which the question at issue should be submitted to the meeting. Ultimately,

Mr. Wallis proposed, and Mr. B. Webster seconded, the following resolution:—"That it is the opinion of this meeting that a standard of weight is preferable to a standard of measure."

Mr. Skelton moved, and Mr. Little seconded, the following amendment:—"That all sellers and buyers of corn in this kingdom should come to the conclusion to petition Parliament to enforce a uniformity of measure of 8 imperial bushels."

The amendment, after having been seconded, was put from the chair, when 18 hands were held up in favour of it, and 18 against it. The chairman then gave his casting vote in favour of the amendment, and the effect of this was of course to carry it. As the original resolution involved the same question as the amendment, and had virtually been negatived, it was not submitted to the meeting.

On the motion of Mr. Wood, seconded by Mr. Thomas, of Bletsoe, thanks were voted to Mr. Wallis as the introducer of the question which had been discussed.

Mr. Wallis, after acknowledging the compliment, expressed his regret that the decision of the Club on the subject which he had brought forward was not in accordance with the opinions of the majority of farmers and corn merchants, adding, that he was not without hope that the time was not far distant when a very different view would be taken of the matter, even in that room.

On the motion of Mr. Grey, seconded by Mr. Wallis, a vote of thanks was given to the Chairman; and, after a brief response from that gentleman, the meeting separated.

HALESWORTH FARMERS' CLUB.—The members of this Club have been engaged in an interesting discussion on the "Principles of Rating." The question was introduced in an able speech by Mr. J. Howlett, of Wisset; and the discussion which ensued extended to considerable length. We must content ourselves with recording the following resolution, which was unanimously adopted: "That the principles of rating having undergone a lengthened discussion, it is the opinion of the members present that, in order to secure one uniform rate, as prescribed by Act of Parliament, the several boards of guardians throughout the country should be vested with full powers of correcting not only any inequalities which may be presumed to exist as between parish and parish, but also as between their respective unions; and further, that all poor-rates should hereafter be levied and made by the authorities so constituted, instead of by the different churchwardens and overseers."

THE IMPERIAL BUSHEL THE BEST STANDARD MEASURE.

The difficulties to be encountered in arriving at any uniform system of Weight or Measure in the sale of corn were very forcibly illustrated at the February meeting of the Farmers' Club. Of course, the great advantage of a central body like this is, that it combines the opinions and experience of almost every part of the country. The uses of such a power could never be more apparent than when applied to the consideration of the subject here brought under discussion. Any merely local Society — be it a district Club, a Board of Guardians, or a Corn-market Committee — would, and have, most probably, made very short work of such a question. They would just resolve and recommend in accordance with their own habits and practice. Let the uniform standard be their own; let everybody come round to this, and then we shall do very well. At the London Club, however, nearly every man represented a district, and, more or less, a system of his own. Indeed, we really believe that, when at last a definite motion had to be put, there was scarcely a member present but who, had the opportunity been allowed him, would have proposed, amended, or suggested something a little different from that of his neighbour—A neighbour, be it understood, sitting in the next chair to him at the meeting, but coming from quite another quarter of the kingdom. It is, we must repeat, such component parts as these which give peculiar value and importance to the proceedings.

Under these circumstances Mr. Owen Wallis' well-arranged tables and careful series of results told by no means so strongly as might, perhaps, have been expected. It appeared to signify very little what the Dolgelly Union or the Arundel Farmers' Club thought about the matter, as everybody came manifestly prepared to think for himself. Mr. Wallis, in fact, did not read the digest of evidence we give in our report. With very sound discretion he contented himself with stating what the tendency of this was, and how thoroughly he agreed with the majority. Everybody, as a rule, insisted on the necessity of uniformity, either of weight or measure; while a far greater number of the opinions thus collected were recorded in favour of sale by weight. In the discussion, on the contrary, the preponderance was the other way. The two most able and suggestive of all the speakers who followed the introducer of the subject were Mr. Robert Baker and Mr. Spencer Skelton, and both these advocated a measure of capacity; or, in other words, the more general recognition of our present standard, the imperial bushel. There is no doubt, either, but that the addresses of these two gentlemen had considerable effect upon the audience, and that they are mainly responsible for the conclusion arrived at. Figures and tables do not go for much, on occasions like these; but a good plain argument is sure to make its way.

When the Central Club, during the past year, took up this question, certain of the leading members resolved themselves into a special committee. The opening of Mr. Wallis' address will show what steps they took to put themselves in communication with the country, while his paper may be regarded as embodying the sense of this correspondence. Previously, however, to issuing their circular, the committee started with two propositions, which they severally moved, passed, and eventually embodied in their public etter. The first of these formally declared, "That a uniform system of weight or measure for the sale of corn is desirable." The second stated more definitely, "That this Special Committee feels justified, from the communications received, as well as from the opinions expressed, in recommending the sale of corn by weight as the best means of establishing uniformity of system in the sale of agricultural produce." Now, it will be found from the conclusion arrived at on Monday evening, that a general meeting of the members have corrected this opinion of their committee. In the face of the increased evidence in favour of weight, a majority, with the Chairman to head it, have declared themselves in open council for the imperial bushel. This is pretty sure to be regarded in many different ways—as stultifying what has already been done—opposed to the general feeling of the country, and so forth. There was some little demur as to the order in which the resolutions were put; but considering that Mr. Skelton's amendment was clearly carried, we do not see much to complain of. It should be explained that many members had left before the division took place; not that we think, had this been asked for earlier, would there have been any other result.

We shall venture even a little beyond this, in saying that we see nothing whatever to complain of, in such a termination to the proceedings. We consider it to have been the most practical determination that the Club could possibly have arrived at. We believe that, if in our generation, we are to have any uniformity of system, it will be accomplished only by the imperial bushel. We have some reason for thinking that if the Government does interfere, in answer to the wishes of the country, it will be only to more rigidly enforce its own standard. We are very sanguine that by such a means the object is feasible. On the other hand, a measure of weight is positively hedged in with obstacles. The Government will not merely have to ignore the principle it has so far maintained, but to upset and revolutionize with this many a subsequent measure engrafted upon it. There is the Tithe Commutation Act, riding easily and pleasantly at last—all to be done de novo. There are our corn rents, and so forth, all to be fresh arranged. And there are the many districts—in the majority, as we imagine—which are now accustomed to the imperial bushel, and the fact of eight bushels making one quarter, to be untaught, and then schooled over again, by the same master!

It is not our purpose to go very minutely here into the merits of the two systems. The decussion will show that much may be said, for and against either. A farmer's man, according to Mr. Wallis' experiment, cannot measure up a bushel of corn twice alike—so much for measure; while by Mr. Baker's story, a miller can *guess* nearer to the weight of a sack of corn than ten farmers can actually weigh it to—so much for weight. Perhaps, after all, the better plan would be, as is now often done, to combine the two, and deliver a *bushel* of corn of a *certain weight*. Call this what we may, a measure of capacity or of weight, it has the recommendation of going for its fixed standard to the already acknowledged one of the country. By such a path we might hope to find our way out of this difficulty. By any other we fear we should only become involved in a labyrinth that few would care to help us to explore.

In the hands of our rulers this resolution of the

Farmers' Club should, in short, be a strong and ready weapon. The whole country demands uniformity; and when you gather together the delegates of the whole country, who offer you evidence quite as valuable as that you would obtain by the slow, tedious process of a committee, what do these ask you to do? Is it the dangerous or costly experiment of a new system? Is it something that the people know little of, and that they will take to with proportionately little liking? Nothing of the kind. The buyers and sellers of corn simply request that you will be good enough to stand by your own act. You have said there should be an imperial bushel by which all such transactions should be regulated. Granted. We are willing to obey the law if you are only ready to enforce it. There is an old joke against a certain county member who drew up a most meritorious measure, but who forgot to insert any penalty for its non-observance. In this instance the framers of the bill would appear most carefully to have "provided always" that people should not use the imperial bushel without they cared to.

We shall obtain no uniformity by such half-measures as these. What the country simply wants is "the Bill, the whole Bill, and nothing but the Bill." Let the question be argued as it will, there is no doubt but that we are becoming more and more accustomed to the imperial standard; and its general enforcement would be attended with little inconvenience or annoyance. Comparatively, there is no other such a means so ready to our hand; and we cannot help thinking that the Farmers' Club resolution will stand as a tolerably good finger-post. It points to the safest way and the shortest.

ON THE TRANSFUSION OF BLOOD IN THE HORSE.

By Mr. James Farrell, V. S. to the Lord-Lieutenant and Constabulary force in Ireland.

During the autumn of 1856, and spring of 1857, an epidemic prevailed in and about Dublin; indeed, I believe, all over Ireland, to a greater or less extent; which at its outset presented the leading features of influenza, but of a low typhoid character; it was much more prevalent along the eastern coast than on the western, or in the midland counties. In Dublin it was very fatal, and in most of the cases which I was called on to see I found intense debility, which in some instances had come on within a few hours after the disease had first manifested itself. Horses were seen to eat their food in the morning with every appearance of health and good spirits, and before evening they were found resting against the side of their stables for support; so rapidly had debility followed the first symptoms of the disease.

With all these cases the principal difficulty was to support the strength, watching at the same time closely the symptoms which manifested themselves as the case progressed. Sometimes the urinary organs became affected, and repeated evacuations caused the patient to sink rapidly. In others the bowels were involved, and to such an extent as to resemble bad cases of cholera in the human subject; but the worst forms of this disease that I witnessed were those in which the animals had been bled previously to my having seen them. With those cases which had not been bled, I had, in treating them, an average amount of success; but in most of those that had, I am bound to admit, I was by no means so fortunate. I found that everything I could do to restore the vital powers was, in the majority of cases, useless, and, save in the instance of some young, vigorous horses, collapse set in within a few hours after the abstraction of the blood.

I gave a fair trial to all the usual remedies. In cases where influenza had assumed a typhoid form, and in which the leading symptoms were a feeble, thready pulse, quick and laboured breathing, cold extremities, clammy mouth, drooping eyelids, utter prostration of strength, and, in short, the usual symptoms of collapse, especially such as had been reduced to this state by loss of blood, or by excessive purgation, I was generally unsuccessful. Discouraged by repeated failures, I determined to try the effect of "transfusion," believing it to be a not unnatural restorative, especially in cases where the improper abstraction of blood had superinduced the symptoms above alluded to.

To enable me, therefore, to give this operation a fair trial, I commenced a series of experiments, so as to discover the simplest, safest, and most effectual method of conveying blood from one animal into another: I first tried the transfusion syringe, which has been used by medical practitioners for this purpose; but, whether from want of skill in its use, or from some defect in the instrument (which had been recommended to me as one of the best), or from some other cause, I cannot tell, but certain it is I was in no case so successful with it as I was with a more simple apparatus. I fancied that the blood lost much of its vitality by being exposed to atmospheric action, and also by its being forced and compressed within the cylinder of the instrument. These impressions as to the cause of failure induced me to undertake several experiments, with a view to the construction of an instrument which would fulfil the requisite indications, viz., to allow the blood to pass freely from the vein of the healthy into that of the diseased subject without coming in contact with the atmosphere, and without alteration of its temperature. I at length adopted an exceedingly simple apparatus, which may be described in a few words. It consists of an india-rubber tube some two-and-a-half feet in length, and three-eighths of an inch in diameter—that is, about the calibre of the vein in the adult horse. To either end of this is fitted a silver tube, curved somewhat like a syphon, so that the end, which is slightly rounded at the point, might be passed easily into the vein, both tubes being exactly alike. A narrow zinc or tin trough is required to contain hot water, in which two-thirds of the tube should be immersed during the time that the blood is flowing. This completes the apparatus, and, being prepared, and the horses ready, held by assistants, the jugular vein of the healthy horse, from which the supply is to be taken, may be opened, and into it one of the silver tubes carefully passed, point upwards, so as to receive the current of blood as it flows back from the head; the operator holding the other end, and, having previously opened the corresponding vein in the patient, he should wait till the current is passing freely down the tube from the healthy horse, and then bring it in contact with that which is now flowing slowly from the patient; he should pass the end of the tube carefully into the vein, point downwards, by which means the possibility of any air getting into the tube is avoided. The quantity to be transfused is readily ascertained by watching the expression of the eyes, and noting the pulse carefully. So long as there is no dilation of the pupils, and so long as the heart's action is not very much affected, the blood may be allowed to flow on uninterruptedly; but as soon as the pupils become dilated, it is necessary to lessen the supply gradually, by compressing the tube with the finger and thumb. If the dilatation disappear after a minute or two, the blood may be again allowed to flow; but if it increases, further transfusion must be stopped, or otherwise injurious consequences will result. In the cases of two animals which I purchased for the purpose of experiment, I purposely allowed the blood to flow after the dilatation of the pupil had manifested itself, in order that I might see the result; and I found it to increase: and in one of the cases, after winking both eyes three or four times in rapid succession, the horse reared up, and fell back. In the other case, I forced the blood in from an india-rubber enema bottle. The pupils first became still more dilated, the breathing very quick and difficult; the eyes assumed a wild, agonized look; and the animal, with a sudden bound forward, fell dead. I had my finger on the artery during the entire time, and observed a great unsteadiness and fluttering of the pulse, which increased in frequency until the instant before he fell. In the first of these cases I did not force the blood into the vein, but allowed it to flow until I perceived the injurious effects on the horse. He tottered and fell, but in a short time recovered, and was walked back to his stable. He died in the course of the night; and, on examining his head next day, I found considerable congestion of the brain. The tube used for these experiments transferred about three quarts of blood in eight minutes—at least, so might be inferred from the fact that, when used as a syphon, it passed three-and-a-half quarts of water (and a little less of oil) from one vessel to another in that time.

In one of my successful cases, *phlebitis* supervened both in the healthy and diseased horse. I think I am correct in saying that this disease is by no means so likely to occur in horses as in human beings, and is certainly not so formidable; but, nevertheless, I am quite sure that it may happen as a consequence of the operation, if the instrument be not kept scrupulously clean, and also if great care be not taken in its introduction into the vein. Having, from these and other experiments not necessary to detail, determined on the mode of operating most likely to be successful, I shall now proceed to state the result of four cases in which I have operated, and which I think I may look upon as having been followed with entire success. In three of the cases, the patients had been bled a short time previous to my having seen them, and were so much weakened that they could scarcely walk. In the fourth case, a drastic purgative had been administered, causing super-purgation and great prostration of strength. In each of the four cases, the condition of the patient was so similar, that the description I have already given may answer for all. Having selected a healthy young horse, from which to obtain the blood to be transfused, I opened the jugular vein in the patient and in the healthy subject; and having inserted the tube, as before described, into the vein of the healthy horse, I placed the Inida-rubber tube in the tin trough containing the hot water to maintain its temperature, and the other curved tube into the descending portion of the vein in the patient. As soon as the current from the healthy horse had completely expelled all atmospheric air, the instrument being thus arranged, the blood flowed freely from the vein of one horse into that of the other in an unbroken current. The average quantity of blood transfused in each of these cases was about three quarts. I observed no particular symptoms to follow from the transfusion, until two quarts or more had passed from the healthy to the diseased subject; but as soon as about that quantity had flowed, there appeared to be produced an amount of stimulation indicated by an increased action of the heart; at the same time the pupils began to dilate, and the countenance evinced an anxious expression. My former experiments led me to watch with great care the progressive dilatation of the pupil, and I deemed it expedient in each case, when this symptom was well developed, to compress the tube so as to diminish the current and allow the transfusion to proceed more gradually and slowly. Occasionally I almost completely interrupted the current until the subsidence of this symptom; and I found that, when about three quarts had been transfused, any additional quantity was followed by unpleasant symptoms, which indicated the necessity of stopping the operation. On removing the tube and closing the vein, all symptoms of irritation gradually subsided; and the pulse, from being rapid and irritable, became slower, stronger, and fuller, gradually approaching the healthy standard.

In each of these four cases the reaction was steady and progressive. The natural warmth of the extremities was gradually restored; and in the course of ten or twelve hours the patient presented other equally unmistakable symptoms of amendment, such as returning appetite, more quiet and steady respiration, cheerfulness of countenance, and a willingness to move about: from this point there was a gradual improvement, and in a short time they were pronounced cured.

I have been induced to submit these few remarks, much less with a view to record any little success I may have had in performing the operation myself than with a hope that others, far more capable, will take up the matter and test it thoroughly; for whatever obstacles and objections there may be to its performance in the human subject, there are none to prevent its becoming a most valuable agent in veterinary science.—*Dublin Quarterly Journal of Medical Science.*

MR. POPPY, OF WITNESHAM.

TO THE EDITOR OF THE IPSWICH JOURNAL.

DEAR SIR,—The letter which I enclose was addressed to me at the Grundisburgh Farmers' Club, on Monday last, and read at the meeting. The members who were present were unanimously of opinion that a subscription should be immediately entered into, in behalf of Mr. Poppy, and they thought it advisable that his case and claim to the sympathy of the agricultural community should be made known through the columns of your *Journal*, the *Suffolk Chronicle*, and the *Mark Lane Express*.

I fully concur in the statement made by Mr. Biddell, and I earnestly hope that steps will be immediately taken to assist the worthy promoter of agricultural progress.

I am, dear Sir, yours truly,
G. D. BADHAM.

The Sparrow's Nest, Jan. 27, 1858.

MY DEAR SIR,—May I beg of you, as president of the Grundisburgh Farmers' Club, to lay before the meeting the present position and circumstances of Mr. Poppy, of Witnesham, and his claims to the sympathy of those who have been interested in the prosperity of agriculture.

Forty-five years ago, and long afterwards, no man did more, nor hardly any half so much, in proportion to their means, as he did, to promote the general cultivation of Swede turnips and mangold wurtzel—proved now to be the most valuable roots introduced in farming within living memory. I remember the exertions he made, year after year, to convince farmers of the value of beet roots. He set the example of growing them in his fields. He induced persons (myself amongst others) to send stock upon his land to eat them, to prove their value. He distributed seed in several counties, and wrote about them in pamphlets and newspapers; and I believe the general growth of swedes and beet in this county was many years earlier on account of Mr. Poppy's exertions to bring them into notice. I never heard of the white Belgium carrots till they were brought from that country (or France) by Mr. Poppy many years ago (probably upwards of thirty). His experiments and publications on securing Swede turnips from flies, procured him a gold medal from an eminent distant agricultural association. Upwards of thirty years ago, he urged the advantages likely to arise from country farmers' clubs, and was chairman and principal manager of the first established in this county—that at Ashbocking—from whence arose, directly or indirectly, those of Framlingham, Halesworth, Harleston, and others, which had the advantage of his correspondence. His experiments and writings to preserve young turnips from flies, and his examination of expedients that have been tried to effect that purpose during the last thirty or forty years, deserve notice; but particularly his recently proving (so far as two or three years are proof) that drilling only two or three rows of thick mustard will effectually preserve a whole field of young turnips from flies. This discovery is entirely Mr. Poppy's; and, assuming it to be effective, is of incalculable value to the farming interest. He has never had an interested motive in what he has done, beyond the wish that others might profit by his experience.

Under these circumstances may I beg that you will propose to the meeting some moderate subscription for him, and promote that object in any way you may think advisable. Mr. Poppy is now at the age of eighty-five, and his wife nearly eighty. They are living in a cottage, respected by all who know them, upon very small, precarious means, insufficient for the common requirements of comfortable humble life.

My state of health prevents my rendering you any assistance in forwarding the object I have mentioned, but I shall be happy to receive any contribution which may be forwarded to me for Mr. Poppy's benefit. It is much to be wished that some of your influential friends may co-operate with you in getting up a subscription as the reward of merit for Mr. Poppy, in a wider circle than the respectable club over which you preside.

I am, my dear Sir, with every respect,
Yours sincerely,

Playford, Jan. 25, 1858. ARTHUR BIDDELL.

[We need not say that we shall be happy to do anything in our power to promote the object of Mr. Biddell's letter.—EDITOR FAR. MAG.]

FARMYARD DUNG: PREPARATION AND APPLICATION.

No subject in the varied course of agriculture obtrudes a more general notice, or deserves a more important consideration, than the application of farmyard dung. The article is produced on all lands on which grains grow and animals are kept, and is the most efficacious of all manures that are yet known. It is a mixed body of straws and excrements, urinary and solid, possessing the quick action of the latter substances, and the more durable qualities of the former materials. All other manures are brought from foreign places, and purchased by a ready cost; farmyard dung is daily produced, and of a constant repetition. The use is varied and of a great value, and the application is no less important.

An approved and long-continued mode of preparing farmyard dung prevails in the celebrated turnip-growing Border counties, of placing the contents of the cattle yards in square piles about six feet in height, in the corner of the fields to be planted with green crops. The yards are concave or dish-shaped, retaining and spreading the moisture equally over the mass, and supplied with straws that absorb all the moisture from rains, snows, and urine. The contents are carried out at two different times during winter, and no pressure is allowed on the piles, except the weight of one or two persons to spread the materials evenly and thinly over the heap. In this condition, a fermentation reduces the heap into a saponaceous mass for use in May and June, and in a condition that is easily divided by hand-forks, well moistened, and from which the heat of fermentation has in most cases nearly altogether vanished. Much bulk is lost by this mode of preparation, but it is reckoned the best for the use of green crops.

Having been educated under the above system of preparing farmyard dung, I practised the mode with the usual success in various parts of the kingdom. In later years I adopted another mode, from the observation of a very large loss of bulk, and from a wish to use a fresher condition of the dung. At any times of convenience during winter, the contents of the yards are carried to the green-crop fields, and laid in a heap sloping at both ends, over which the carts pass to deposit the loads, and over which the materials are spread evenly and thinly, in order to mix the substances, and that no part remain in a dry state. The consolidation from the pressure of the carts prevents the fermentation of the heap, which is formed at convenient times, from November to the month of April, and later when the yards are duly moist and the straws thinly used. Potatoesare the first- planted green crop; and about ten days before the dung is required for use, the heap is turned over with forks, laid loosely together, and the lumps well broken, and the dry outside of the heap thrown into the middle of the new aggregation. A very active fermentation immediately commences, which is prevailing during the deposition of the dung in the drills, which are immediately reversed and the seed sown. This mode produces fully equal if not superior results to the first-mentioned preparation: it affords a larger bulk, and more convenience in forming the heaps at different times; while the former requires to be done at one time, or not at distant periods.

For some considerable time past, I have doubted the fermentation of farmyard dung, having had freshly-voided fæces, carried from the cow-shed, laid into drills for turnips, which were a superior crop to the parts of the field treated with fermented dung. This result happened on several occasions, constituting a fact, from a majority of similar results. In order to facilitate the application of fresh dung, I have long ago recommended that all straws for litter should be cut into short lengths by the thrashing machinery, and that the dung be mixed with the prepared turnip-lands by contrary workings of Finlayson's harrow, and raised into ridglets by one furrow of the common plough, in which the seeds are sown by the common two-drill machine, or with a portion of bones or guano by Hornsby's drop drill. This practice will supersede the fermenting heap of farmyard dung, and remove the objection of long straws not covering into the ground, by cutting into short lengths. The fæces and short straws will be convenient for Chandler's liquid manure drill, when Mr. Kemp's theory has advanced into a more general notice.

The application is most excellent of farmyard dung as a top-dressing of young grass seeds; and for that purpose, the fresh, strawy condition is preferable. The crops of clover are largely increased, and also the following crops of wheat. I have long ago suggested that the farmyard dung generally applied on bare clay fallows, for wheat, be applied as a top-dressing on the young wheats, in March, by means of moveable timber railways placed on the ground. But, most unfortunately, now-a-days, no opinion, theory, idea, or suggestion meets with any notice, except it emanates from a society or a club. Individuals languish in obscurity, and are held in insignificance.

The use of food being to produce caloric to plants and organic bodies, the chief consideration is, how to apply the manures as food for that purpose, and, in order to yield that element in the least expensive manner and most ample quantity. I wholly dissent from chemistry—that rotten dung is more efficacious than fresh dung: weight for weight, and quantity for quantity, the latter must prevail in the abundance. The many statements made, of chemical agencies and transformations, are of small account.

With regard to covered and uncovered feeding-stalls, the former may suit in certain places; but in the majority of situations, the straw could not be reduced without the rains and snows that fall in the yards; and, under the covered sheds, the want of moisture produces a dry putrefaction. Even with the present open yards, much difficulty is experienced in reducing the straws into an impregnated condition with rain and urine.

I have not the pleasure of an acquaintance with Mr. Baker, of Writtle, nor do I know his appearance from sight; but I have ever admired the sound and enlightened judgment displayed by him on all practical subjects, and the strong sense that he brings to bear on the reveries of cognate auxiliaries. These aids are but puny, shallow, and evanescent; apt to dazzle and deceive, to bewilder and mislead; and often noisy as the tinman's trade. An enlightened practice must lead and confirm.

J. D.

KENNINGTON AGRICULTURAL AND CHEMICAL COLLEGE.

LECTURES ON THE GENERAL PHENOMENA OF THE EARTH, HAVING REFERENCE TO THE PRODUCTION AND MAINTENANCE OF ORGANIC LIFE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY, GUY'S HOSPITAL.

LECTURE XIII.

While the minuter forms of the Alga are continually employed in preparing their aquatic abode, whether sea or river, lucid lake or turbid pool, for the development of higher grades of vegetable life, parallel creations on the land are equally active to a similar end, working alike unseen, and even unsuspected in the earliest fulfilment of their functions. These are the Lichens, the first in our classification of terrestrial plants, and the natural precursors of the groups which follow on the scale. The cause of their first appearance, in any particular locality, is as much of a mystery to the human observer as is that of their aquatic brethren; though, as in the case of the latter, their after-propagation is the result of laws, the action of which is generally recognized in vegetation of a higher grade, however insufficient theory may yet have proved to its elucidation.

Let us examine the history of Lichen production and successional development—not critically, and under the influence of philosophical prejudices, which too often tend to lead us to false conclusions, but, as it may be read on the page of Nature. A newly-bared surface of rock, or sand, or soil, a brick or tile, nay, even a pane of glass, exposed to air and light, becomes the resting-place of myriads of microscopic atoms, which enlarge and multiply their kind; that kind is the simplest organism imagined or recognized by human senses: it is the cell again; the *cell* is the plant itself, developing the *cell* its germ, its beginning and its end the same. Such is ever vegetation in its earliest appearance, where organic elements are wanting for the production of a higher or more complicated frame; and our microscopic atoms are the first colonisers of the hitherto barren spot of earth—the pulverulent Lichens. We may pause awhile, to speculate as to whence they come. The minuteness of the germs—(seeds we will call them, though the botanist may cavil about the term)—of these little plants, is such, that the lightest movement of the air may dislodge, and bear them to incalculable distances; and, without exaggeration, we may assume that, like the moisture which is mingled with the atmosphere as viewless vapour, they may be constantly present throughout its whole expanse, be inhaled with our breath, and distributed with every wind that blows. I am not, in this assumption, violating the compact just made, at the commencement of the present paragraph, to avoid for the moment all mere theory, and examine fact as it exists, alone and without bias. The origin of a living being is required; and when we note the successors of such being making their appearance under circumstances of universal operation, we are justified in seeking a corresponding source for itself. The doctrine, ascribing the apparently spontaneous development of individuals, belonging to the lowest classes of vegetation, to this constant presence of their seeds floating in the atmosphere, cannot be proved to demonstration; but when we learn that certain of the simpler forms of fungus, as mould, &c., are found in the diseased tissues of living animals, and only upon such as are exposed to contact with the air, as upon the surface of their bodies, or in the air-cells and tubercular cavities in the lungs, as well of mankind as of the inferior animals, their origin surely is too evident to admit of misconception: wherever seen, they are the produce of such air-borne germs, which require only a resting-place to commence the career of growth and reproduction.

Linnæus, comparing, in a fanciful mood, the aspects and functions of the individuals composing the great natural families of the vegetable kingdom with the several grades of human society, bestowed the Latin title of *Vernaculi*, or bond-slaves, on the Algæ; under which denomination he included both the plants so called by modern botanists, and the Lichens, the relative structures of which seem to have been prefigured in his mind at a period when microscopic research had yet done little or nothing towards the elucidation of such resemblances. The title is, as observed by the late Professor Gilbert Burnett, of King's College, London, peculiarly appropriate to the Lichens, "which are, as it were, chained to the soil they labour to improve for the benefit of others, though from it they derive no nourishment themselves." The latter assumption is, in most instances, probably incorrect, as may appear from our coming inquiry; a circumstance, however, that does not greatly interfere with the justness of the comparison.

The modern system of farming by rotation crops, superseding the antiquated process of fallowing, is only the adoption of principles constantly in action under the government of Nature; and the history of the little plants before us strongly exemplifies a fact, of which our stubborn ancestors, and even many of their less-informed successors, were long in becoming convinced, namely, the influence of the unseen and intactible upon the visible and tangible. The necessity of accumulating the proximate elements belonging to the higher forms of life, before the introduction of the latter upon the face of the world, has been already remarked upon, in one of our previous lectures; and where are the constituents of these compounds, the true elements, to be found? whence are they to be elaborated, but from the rock, the air, and the water, each in itself incompetent to their necessary elaboration! Life must precede life. This is the grand law under which organic being, once produced, can alone be maintained; a law enunciated when creation was an act, and which has remained such since that act was fulfilled. No chemical manipulation of the inorganic atoms of the fire-tempered granite or greenstone produces the required compounds of animal and vegetable substance; the vital principle alone being capable of adjusting their proportions, modifying their affinities to such a purpose, and eliciting the mysterious combinations. The modern practitioner in that glorious art, which seems to sport with the elements of simple matter, bidding them unite and separate at will, fails in this. True! he can arrange and disarrange the organic atoms, force them to assume a different form, and, so long as they remain organic, control results, even as he acts upon the mineral; but he has no producing power. He may call forth the starch, the sugar, that did not exist as such before; nay, even the odours of the rose and of the violet, where no flowers are at hand to yield them. But, the products of organisation, that are here his playthings, are only compelled into action under their own affinities with surrounding matter; and those affinities, once overcome, once unbound, his power over them as organic elements ceases, and a renewed subjection to the laws of life alone can restore them to their former condition.

In contributing to this recurring change and recomposition, every member of both animal and vegetable kingdoms is constantly and actively employed, as a necessary consequence of its existence. But, their mutual operations are too complicated to admit of separate examination, beyond the point of commencement, and a few stages upward upon the scale. On the land, the lichen is, as heretofore remarked, the earliest perceptible agent. But it may be inquired, What is a lichen? The question is as simple and pertinent as might be, What is a grass, a flower, or a tree? but is less easily answered so as to be satisfactory to the uninitiated. The botanist defines a lichen to be a "perennial plant, often spreading over the surface of the earth, or rocks, or trees, in dry places, in the form of a lobed and foliaceous, or hard and crustaceous, or leprous substance, called a thallus, &c., &c." Will this definition answer our purpose? As it is to be feared not, we will try again. The lichens I have before described as constituting a numerous and diversified tribe, and no general definition will convey an idea of what they are in the aggregate. Their simplest forms are seen in the several species of Lepraria, so termed from the Greek *lepra*, scurf or leprosy; and the most common and universally distributed of these, is the green powder, that, in all parts of the country, makes its appearance upon the walls of old buildings, park-paling, and the trunks and branches of trees. A magnifying glass shows it to consist of minute globular or oval grains, closely clustered together. These are the single microscopic cells of which mention has been already made; and the uncertain limits of the lower groups of vegetable life are instanced in the fact that this *Lepraria viridis* has been referred alternately, by different botanists, to the algæ and to the lichens. It is a point of little moment, so far as our present purpose is concerned, to which group it really appertains, as both it and its brethren of similar simple structure and habit are equally pioneers of vegetation. Conspicuous on the objects and in the situations just mentioned, they are no less common on the ground everywhere, where their propagation proceeds more rapidly on exposed and newly-turned soil than among growing crops. To the student of Nature, who thus observes them, it would be an absurdity to deny that their appearance is associated with a function: our common parent admits of no sinecures, no superfluous offices, under her government; whatever is, must act or cease to be; presence is inseparable from need; and the living microscopic atom must work, or die and become the medium of support to others.

The powdery lichen, unseen by the cultivator, or unregarded and despised as is the dust on which he treads, is truly a valuable *bond-slave*, pursuing a slow, but unintermitting toil for his benefit, and elaborating the first organic compounds of hydrogen, carbon, and oxygen, that are destined, on its decay, to become the basis of a higher vegetable form. But it is not within the limits of an agricultural district that we are to expect to see any striking manifestation of the lichen fulfilling the purposes of its existence. We must ascend the mountain towards the verge of perpetual snow, examine the smooth worn surface of rocks recently abandoned by the sea, or walk over the scarcely-cooled lavas of some volcanic region, to trace the progress of primeval plant-development, and learn to admire, and estimate at their true value, the operations of these its hardiest pioneers. The investigator of earlier lichen history must set aside all previous views of vegetable growth, as associated with the necessary presence of soil and root-extension. The barest, nay, almost polished surface, to which adhesion would seem scarcely possible, yields a sufficient resting-place: the imperceptible moisture of the driest atmosphere affords the required medium of sustenance. Many of the tribe appear in the form of a white or grey powder only, and bear so little resemblance to organic substance, that a person unaccustomed to the study would, in most instances, mistake them for casual stains upon the surface of a flint or a saline efflorescence on a mass of granite; indeed it often requires no small degree of familiarity with the general structure of the family, and a glass of high magnifying power, to distinguish some of them from the rock or earth on which they grow. The decay of these minute and obscure kinds, however, affords a thin stratum of soil sufficient for the habitation of other species of more complicated organization, larger size, and more interesting appearance. Some of the higher grades of lichenaceous plants are remarkable for their beauty, elegance of outline, and diversity, as well as brilliancy, of hue.

The remark of an author previously quoted—that, while lichens improve the soil for the benefit of other plants, they derive no nutriment from it themselves—is apparently opposed to circumstances attending their development, different species being found on different substances. This fact is especially instanced in those which are most conspicuous, giving colour to rocks, trunks of trees, walls, and buildings; many of them ranking among the highest forms of their order: and the practical botanist is well aware of the preferences they exhibit. The various primitive, secondary, and igneous rocks yield resting-places to particular species; and so invariable is the attachment of certain kinds to peculiar media, that the geological collector may often determine, by the hue of its surface, clothed with a thin coating of primeval vegetation, the nature and composition of the rock he is approaching. Granite, slate, sandstone, limestone, trap, &c., are each likely to be thus distinguished; and in a similar manner the greater number of the epiphytic lichens, or those which grow on the bark of trees, are not indiscriminately scattered upon the stems of different species constituting the forests of the same climate, but vegetate exclusively upon the surface of those which afford them the necessary texture to which Nature has adapted their powers of adherence. A skilful landscape-painter, observing the effect thus produced, adapts his colours, accordingly, to the trunk of any particular kind of tree he may be desirous of representing. He sees that of the oak invariably differing from that of the beech in the hue of its humble dependants, that of the elm from that of the willow, and so on of others; and so perceiving, his picture becomes a transcript of reality.

This preference of the lichenaceous plant for specific *habitats* is without doubt associated with difference of texture; but it is no less unquestionably attributable to other causes likewise. The lichen, as a cellular vegetable organism, derives much of its subsistence by absorption from the atmosphere, in the same manner as the alga does from the water in which it is submerged; but the elements held in solution by the former are insufficient to supply certain principles which are invariably present in the plants now before us. They must be obtained from other sources; and the succession in which the species appear, following each other always in a corresponding series, is a further and unmistakeable manifestation of the fact. Metallic oxides (that of iron especially), earthy and alkaline salts, are present in all of the higher forms; and the bases of these proximate principles existing in the supporting medium, whether earth, rock, or tree, their separation from it by organic action might be anticipated. Again, if we examine closely the attachment of many of the more minute, and even of the larger, crustaceous kinds (understand by this latter denomination, those which adhere like a crust to the substance on which they vegetate), we shall find that their under-sides are not superficially adherent only, but actually imbedded. This is the case with some which grow upon the hardest siliceous rocks and stones, and even on the glass of old windows; and it probably arises from the elaboration, during their growth, of oxalic and other vegetable acids, which, however weak and powerless in their action on such substances when mechanically applied, overcome the cohesion of their atoms during the slower process of organic assimilation. By whatever means, however, such an effect may be produced, its importance is the same; and the ministry of the lichen, commencing with the modification of the mineral elements of the fluid-water and viewless atmosphere, is succeeded by a corresponding action upon the solid crust of the earth.

The more conspicuous and complicated species of these plants, though they may often be observed covering spaces of considerable extent, to the apparent exclusion of all others, are, individually, only so many grades in the grand natural scheme of fertilisation. In describing one of the most beautiful of the series, the *Stereocaulon paschale* of botanists, Sir James E. Smith, mentions having observed it coating the lavas of Vesuvius, which looked, at a distance, in many parts, as though they were covered with snow, owing to the abundance in which it vegetated there; but this species, chiefly, if not entirely, confined to volcanic and plutonic rocks, only appears upon them as the successor of many others, which have from time to time vegetated and decayed to form a soil fitted for its development; and the same may be affirmed of its equally or more distinguished brethren. Mere microscopic specks, like grains of impalpable powder, commence the mighty operation, solidify the air and moisture, soften and abrade the rock; broader and denser, and at length leaf-like, expansions follow in their turn, survive their time, and decay, until the deepening soil is prepared to receive the green moss, the grass, and the herb, and eventually becomes clothed with an exuberant vegetation. The course of changes under which the fertilization of a world has been produced has attracted the attention of an English poet, whom, as a correct observer of nature, a naturalist may venture to quote—

> "Seeds, to our eyes invisible, will find
> On the rude rock the bed that fits their kind.
> There in the rugged soil they safely dwell,
> Till showers and snows the subtle atoms swell,
> And spread the enduring foliage; then we trace
> The freckled flower upon the flinty base.
> These all increase, till in unnoted years
> The stony tower as grey with age appears:

With coats of vegetation thinly spread,
Coat above coat, the living on the dead;
These then dissolve to dust, and make a way
For bolder foliage, nursed by their decay.
The long-enduring ferns in time will all
Die, and depose their dust upon the wall;
Where the winged seed may rest, till many a flower
Shows Flora's triumph o'er the falling tower."

The lichens being the first purveyors of soil, it might be naturally supposed that these plants—whose invisible seeds seem to be ever at hand to fulfil their allotted function—would exist on all parts of the earth; and it is so. Their tissues are so little affected by the extremes of heat and cold, that the same apparent species is sometimes found occupying climates the most adverse, situations the most dissimilar in this respect; and regarding the order, or group, collectively, it may be stated as being distributed from the poles to the equator, and from the sea-level to the highest mountain summit, where certain species clothe the perpendicular rocks, amidst snows and glaciers, in the regions of ever-during frost. In these lofty alpine districts and lands, far beyond the Arctic circle, vegetation does not advance beyond the production of these obscure plants; but they are forming in such situations the basis of a soil which, under some future condition of our globe, may be hereafter destined to the support of vegetation of a higher cast. Thus circumstanced, they seem to constitute the first step between death and vitality; they have been called "the first heralds of life," but it is of a life which here commences and terminates with themselves.

The number of known species of lichen it is difficult to estimate with any approach to correctness, on account of the variations in aspect induced by difference of climate, exposure, and other circumstances. According to the enumeration of Fée, there exist between two and three thousand, but not more than half that number has been hitherto accurately examined and described; and of those which have been subjected to this ordeal, many are, doubtless, mere varieties of well-authenticated species in different stages of development.

Taken in the aggregate, the lichens present a structure and appearance too much diversified to admit of any general description devoid of the technicalities of botanical science, or, even if so encumbered, without illustrative figures. But we may take the green powder, already spoken of under the name of *Lepraria viridis*, as an example of one of the simplest forms of the tribe. An examination of the sides of a chalk-pit or open stone quarry will make us acquainted with a higher series, in the condition of minute black or coloured specks scattered over those parts which have remained for a few months undisturbed. A lens or magnifying-glass will be requisite to detect their organic character; but many of these are of beautiful and complicated structure, and in noticing them we have made, not one step, but over-strided many on the scale of vegetable creation. Patches, often circular in outline, of white, yellow, brown, or grey occurring on the walls of ancient buildings, rocks, stones, &c., lead us a few grades further. Some species, again, of thin leathery or papery consistence, overrun the ground in woods; others are clustered in bunches round the branches of trees, or hang from them like rags or hair; while several of equally varied aspect vegetate among the slender grasses and heaths on our moors, some branching like tufts of white coral, others spreading over the soil as a grey crust, and sending up numerous little greenish-grey stemmed cups or miniature goblets, bordered with studs of the most vivid crimson. Such are some of the more conspicuous members of the lichen family.

Highly valuable in the economy of nature, these plants are—like their aquatic parallels, the algæ—of comparatively small account in that of man. Consisting chiefly of a proximate principle allied to starch, they are generally more or less nutritive; a circumstance that, in cold climates, renders some of them useful articles of subsistence.

The species which has most attracted attention in this respect is the Iceland moss of our druggists—*Cetraria Islandica* of botanists—a plant that has long been a popular remedy in consumption and diseases of the chest. Though a native of North Britain, all that is used here is imported from Iceland and Norway. In Iceland, it is a common and much prized item in domestic economy, and is collected in large quantities for winter use as food; and the inhabitants of that barren and uncultivatable land, have a current expression that "the bounty of the Almighty gives them bread out of the very stones;" the lavas and volcanic stones on the western coasts of their island being covered with it. Previous to using they steep it in cold water, which extracts a bitter principle found in many of the lichens in their natural state; it is afterwards dried and reduced to a powder resembling meal or flour, which is either kneaded into cakes, or boiled with milk and eaten as porridge; in the latter state it is said to constitute one of the most wholesome and palatable articles of Icelandic diet. Some other species belonging to the genus *Gyrophora*, and growing abundantly on the rocks of Arctic America, are eaten by the hunters of Canada and of the Hudson's Bay Company, under scarcity of more nourishing food, being known among them by the name of rock-tripe or *Tripe de Roche*. Another lichen is the favourite food of the rein-deer: this is the *Cladonia rangiferina*, or rein-deer moss; a species which, in Lapland and other high northern regions, attains the height of a foot or eighteen inches, and supplies the place of grass; covering the gronnd, according to Linnæus, over hundreds of miles in extent, and presenting to the eye of the traveller the appearance of a vast tract of snow during the summer.

Several of the lichens yield valuable dyes: of these archill or litmus, prepared from a maritime species *Roccella tinctoria*, and cudbear, obtained from *Lecanora tartarea*, a crustaceous kind, common on our mountains, are the principal.

A few species are said to be poisonous, but the repute is doubtful.

With few exceptions our hardy vegetable pioneers are left undisturbed by their fellow-beings of the animal kingdom, from the insect to the man, that the work so essential to the welfare of every grade of existence may be fulfilled without stint or measure; and wise indeed has been that dispensation under which their earliest and most important functions are concealed from human eye, and placed beyond the control of human judgment, allied as are all its actions with human caprice and blindness to future results.

THE NEW POWER, AND ITS FURTHER APPLICATION TO AGRICULTURAL PURPOSES.

In drawing attention to the plough, we have purposely avoided referring to a defect, which, according to many, is productive of the greatest practical evil in working—we allude to the padding or poaching of the soil by the horses' feet. Although it is necessarily an evil always attendant upon the plough, it is but right to admit that it is one which is shared in by all cultivating implements, rotary or otherwise, which are dragged, or proposed to be dragged over the land by the power of horses. It is an evil attendant upon the mode of working the plough, but has no direct reference to the plough itself; it is simply a necessity of the mode of working it. It is obvious that this evil can only be got rid of by the introduction of a new power, which shall be able to drag the implement, of whatever kind employed, on and through the soil, without in any degree interfering with the state of its surface, that the soil which the implement has to contend with shall be its natural state; and that the very means employed to work it shall *not*, as in the case of the horse with its poaching feet, bring about a state or condition which shall require the implement in some measure to do away with this if it be possible. Everything around us tells us that this new power must be steam. We have bound this power to be our willing slave, with its might that can shatter an oak, yet be controlled by an infant's hand; and have set it to whirl the wheel, drag the car, and propel the ship; and shall we, in view of the giant aid it affords us in those things, doubt of its capacity to till the soil and reap its products for us?

But in endeavouring to avail ourselves of a new power, it is of the utmost importance that we should consider how, and in what manner, we can most economically make use of it. It by no means follows that we do all, if we simply try to adapt the new power to an old and established implement or system of culture. On the contrary, sound philosophy no less than common business prudence, leads us to consider whether a new implement or a new mode of culture will not probably be required before we can take advantage of the capabilities of a new power. If we look at what has been done in manufacturing machinery—and the best amongst us need fear no shame, or will incur no charge of inefficiency, by taking a lesson from our brother mechanicians who dwell amongst the "cotton men"—we find that this principle is almost invariably acted upon: new machines with new processes, on the adaptation of a new power. It would be as easy as we hope it is unnecessary to cite numerous exemplifications of the truth of this. There is, indeed, everything to induce our agricultural mechanics, on the one hand, to think well as to the best means of availing themselves of the capabilities of this new power by the adoption of a new implement; and our agriculturists, on the other, on the introduction of a new method of *preparing* land for the operation of this new implement; but of this latter consideration more hereafter. There is no such degree of perfection in the work performed by the plough, or such economy in the doing of it, as to induce a belief that our successors will be as much wedded to it as we are ourselves; on the contrary, we have shown that it possesses defects acknowledged by all; and that these, in place of being overcome, may be aggravated by the application of a steady power like that of steam. If the plough is to be retained with steam as the traction power, those defects must be overcome if we wish to attain economy in the working power as well as efficiency in the work performed. But even granting that with these defects overcome, the work performed shall satisfy the cultural requirements of the question, there are many who think that sound mechanical reasoning inevitably leads to the conclusion, that a machine on a principle distinct in its operation from that of the plough will be required, to satisfy at once mechanical as well as its cultural requirements. Modifications of its mechanism may make the plough do good work; it is questionable whether steam-power will enable it to do as cheap work as would be done by steam working an implement expressly designed to aid its peculiarities. There are at all events many reasons for supposing that the plough is not adapted to the new power; hence before much further outlay is made in the direction of applying the new power to the old implement, it will be as well to consider in *all* its bearings the important question. In what direction must efforts be made to avail ourselves of the power of steam for the cultivation of our lands? Too much stress cannot be laid upon the injunction—common-place enough, doubtless, but too often lost sight of, probably from being so very common-place—that the direction in which we are to go must be decided on before any true progress can be made. He would be deemed but a poor navigator who set out from one port to reach another, without providing himself with charts, or information as to the shortest way of reaching his proposed destination. It is not to be wondered at, therefore, that not a few amongst us look upon all plans for steam-*ploughing*, and for substituting the direct traction of a locomotive for that of the horse, as movements by no means in a philosophical direction, although gladly enough admitting their value as transition plans, tending gradually to an appreciation of the capabilities of the new power; forcing our train of thought out of the grooves in which it ordinarily runs, and showing to thinking minds what might be done, not so much from what those plans do, as from what they cannot do.

Leaving then the question as to what the mechanic has to do to bring about the application of steam-power to the culture of land in this transition state, to which the discussions and projects of the last few years have brought it, we proceed to proffer a few remarks on what must, we think, be the duty of the agriculturist in aiding the mechanic in his important task.

If it is true that in certain branches of our manufactures the adaptation of a new power necessitates the invention of new machines, it is not the less true that these new machines necessitate on the other hand increased care in the preparation of the material on which they have to operate; hence we find processes of preparation as well as realization or finishing. It is, we believe, an axiom in mechanical operations, that to make the application of steam power pay for the outlay and the cost of maintaining it in operation, this operation must be continuous. If the process which it is designed to aid be subjected to a series of annoying stoppages through any internal fault in the construction of the machine which carries it on, or through the bad state of the material on which it operates, then a continual drain on the capabilities of the working power is kept up, and much of the advantages] lost which render it, in cases where it is working under fair circumstances, so superior to manual or animal labour. There must be a mutual adaptation of material and machinery; the machine must be fitted to work the material into the final condition which is desiderated, and the material must not present any peculiarities which will prevent the machine giving its best and its quickest work. It is not giving a machine a fair trial to bring it to do work under circumstances presenting obstacles which it was never designed to overcome. And yet this is what has been done by many of our farmers. They have asked our mechanists to invent machines; and when they have been brought out, designed to do work under certain circumstances, they have failed because these circumstances have not existed, and have been blamed for a fault which did not originate with their designers. The manufacturer, in asking a mechanic to devise a machine, informs him of the process through which the material is to be put, and the mechanic adapts his mechanism accordingly; but it is on the understanding that the material is prepared to suit its action; and this preparation of material is effected by machinery or processes possibly as expensive in their first construction and operation as those destined for the finishing of the article; and yet he who grudged these processes of preparation would be laughed at; they form part of the manufacture, and can be no more left out than the part of the Dane in the play of "Hamlet." It will be seen then to what conclusion we are evidently drifting. If the mechanic has his part to do in the invention of a machine or implement to till the land under very different circumstances from those existing under the old system, the agriculturist has no less his duty to attend to, in the preparation of the land, so as to aid to the utmost the adaptation of this new power, and the working of the new implement. There is a position held by many now, namely, that culture of the soil by the power of steam, whether this be effected by the plough or by any other machine or implement, must be a process subsequent to another or others, this or those having for its or their object the preparation of the land so as to aid the cultural operation. If the fields are cramped in dimensions by hedge-rows or ditches, the one must be remorselessly pulled down, the other unhesitatingly filled up; if hillocks or hollows impede the progress of the machine, the redundancy of the one must be cut down to afford material to fill up the vacancy of the other; if huge boulders threaten to stop, or, if not to stop, to damage or injure the mechanism of the implement, these, at whatever cost of time and trouble, must be exterminated. Every obstacle, in short, must be removed, which can tend to impede, and every facility be granted which can tend to aid the progress of the steam-worked cultural implement. We do not say that it will pay to do all this; this is obviously another consideration which belongs to the province of the farmer himself; but taking simply and solely the mechanical view of the question, there can be little doubt that if the steam-dragged plough, or the steam-impelled cultivator, be expected to do all the work of which it is undoubtedly capable, this previous preparation of the land must be gone into. There can be no doubt of the truth of this position, whatever doubt there may be as to the paying capabilities of this thorough system of operation. Half work may pay better than whole; but if whole work, which—to be truthful—is the only real work, is ultimately judged the most expedient to be carried out in the cultivation of land, the whole preparation must also be made. The locomotive without the rails would not attain the lightning speed it does, and the rails would be an expensive investment if horse traction was to be used; the line and the locomotive both, are required to perfect the railway system. So in steam cultivation: there must be a mutual adaptation of the power to the material, and *vice versâ*. In stating these views, we but echo the opinions of many gifted and far-seeing agriculturists and mechanicians; and we are glad to avail ourselves of the opportunity here presented to us, by giving, as closely relating to the point, the opinion of Mr. William Fairbairn, one of the most eminent of our engineers; the remarks were made with special reference to reaping machines; but they have, as will be seen, a close bearing upon the question which has occupied our attention. "There is, however, another element equally important and essential to the efficiency of the process of reaping, and that is the *preparation of the land;* and, in fact, before we can look forward to ultimate success, the surface must be levelled, and the present injurious system of ridges dispensed with. To a casual observer it is obvious that our present state of culture, as pursued in most parts of Europe, is not calculated to afford the necessary facilities for ensuring a successful progression into machinery. To supply machines successfully to the labours of a farm, the land must be prepared, not for hand, but machine labour; and the successful introduction of reaping machines will chiefly depend upon the preparations that are made for their reception. The system of ridges may be tolerated and overcome by the sickle; but to give to the new process of reaping by machinery its full effect, a totally different plan of operations must be pursued, and the fields laid down with a perfectly smooth surface. The larger description of stones and other obstructions should be removed, and in place of the superfluous water not required for the nourishment of the plants being allowed to flow between the ridges on the surface of the field, sweeping in heavy streams, as it now does, everything before it, the new system of drainage will require to be adopted, and the water carried under in place of running over the surface.

To make a machine, such as a reaping machine, work well, everything must not be left to the machine; the agriculturist must do his duty as well as the engineer; and that duty once performed on both sides, a certainty of action will be secured, which will solve the problem, and effect satisfactory results. Having arrived at these happy results, we may then, *and not till then*, reasonably look forward to the crops being well and quickly gathered by machinery, to the exclusion of a laborious process, effected with difficulty and often imperfectly by the human hand."

AIR: HOW INVALUABLE TO THE SUCCESSFUL HUSBANDRY OF THE SOIL AND ITS PRODUCE, ANIMAL AND VEGETABLE.

In our former observations on this subject we directed attention to a general view of it, promising to notice on a subsequent occasion the individual case of soils, plants, and animals, under the different atmospheric circumstances in which they are found. We now propose fulfilling that promise.

In doing so, let us examine wheat, grass, and turnips, grown in different soils, climates, and under different systems of cultivation.

Under the first, as to soil, the practical question at issue may be thus stated, How far does the atmosphere affect the quality of wheat on any individual soil? That the nature of the soil and its atmosphere influences the composition of both the grain and straw of this cereal, is a fact with which farmers have been familiar from time immemorial. To what extent, therefore, is this dependent upon atmospheric phenomena? Calcareous soils, for example, and others abounding in organic substances, yield wheat containing a larger proportion of gluten or nitrogenous matter, than do soils of an opposite quality. How much of this nitrogen is due to the nitrogen of the atmosphere, and how much to that of the manure incorporated with them?

In the case of a calcareous soil, the decomposition of lime by means of air and water obviously works up the oxygen of both the latter, liberating their nitrogen and hydrogen; while they, uniting together under favourable circumstances, form ammonia ($\mathrm{N}\ 1 + \mathrm{H}\ 3$). In this manner 82.545 lbs. of nitrogen, and 17.455 of hydrogen would make 100 lbs. of ammonia, requiring the decomposition of 107.2 lbs. of common air and 167 lbs. of water. Now, as this quantity of ammonia is a sufficient dose for two acres of land, yielding an ordinary crop of wheat, it will readily be seen that the decomposition of this quantity of air and water over such an area, the liberation of this quantity of nitrogen and hydrogen, and their uniting together, is the most likely source from whence the growing wheat plant derives a large portion of its nitrogen.

Pure ammonia, however, cannot thus be formed in a calcareous soil, as it always combines with other substances; but this does not in the slightest degree affect the question at issue, for it signifies little what salt of ammonia may be formed, so long as it is formed and consumed by the plant.

In soils, again, rich in animal and vegetable matter, a similar result takes place during the process of decomposition. As in the case of calcareous matter, air and water are necessary to effect this change, during which the oxygen of both produces, with the vegetable matter, carbonic, ulmic, and other acids, while the nitrogen and hydrogen liberated form ammonia.

If, however, we suppose such a vegetable soil improperly drained, so that decomposition takes place in the absence of air, or a sufficient supply of it, then the vegetable matter and oxygen form the carbonic and other acids; but the hydrogen now unites with the carbon, forming carburetted hydrogen, or the gas of low-lying marshy lands—a gas alike injurious to animal and vegetable life.

Wet marshy soils of this class are, perhaps, the worst for wheat culture of any, being deficient of ammonia to supply nitrogen for the manufacture of gluten. For the successful growth of this cereal, proper drainage and aëration are essential requisites. A certain degree of moisture is, no doubt, necessary to supply hydrogen; but in our moist climate, few crops require so little rain as wheat, while none require a larger supply of atmosphere, beans and peas excepted.

On sandstone and clay soils, naturally deficient of organic matter, and where the inorganic is less subject to decomposition, on the contrary, wheat seldom yields very abundantly, while the quality of the flour is inferior, owing to the small per-centage of gluten which it contains.

This deficiency of crop, and the inferiority of quality, are thus accounted for: In the first place, the inorganic matter being less subject to the action of oxygen than limestone, the decomposition of air and water is consequently also less, so that the supply of naturally manufactured food, both organic and inorganic, is insufficient to supply the wants of a healthy and luxuriant vegetation. And in the second place, the decomposition of air and water being less, the manufacture of ammonia is also less, and, hence, the formation of gluten.

In the case of grass crops again, results are similar, the produce of dry calcareous or vegetable soils being better for rearing and fattening stock, than that of others of a different quality not so subject to the decomposing influence of the atmosphere. We might quote many examples from the rich grazing districts of England and Ireland, in proof of this proposition, were it necessary.

In low-lying, marshy grass-lands, however, the example is widely different from that of wheat-land, in more respects than one. In the first, for example, luxuriant crops of an inferior quality are often produced by this class of soils; and although not equal to straw as food for cattle, they make nevertheless excellent manure. As such we have used immense quantities, both in a green state and dry, for littering stock, and always had fine crops.

For pasturage they are not well adapted; the marshy gases arising contaminating the atmosphere, and thus injuring the respiratory functions of stock, or otherwise affecting their health. In corroboration of this, we shall mention two examples: In the first, large tubercular swellings break out, principally about the neck and chest of cattle, the malady generally terminating fatally. And not only are they affected thus when grazing, but also when consuming in the straw-yard, alike in summer as winter, the produce of such lands, as turnips, hay, and straw. In the second example, cattle never thrive well; while they change their colour, whatever it may be, to a "dirty dun."

Some low-lying wet grass-lands, we must observe, are exceptions from the above examples, the produce being rich in quality and abundant in quantity. This is owing to the water not being stagnant, but rising to the roots of plants by capillary action, and bringing a sufficiency of lime, alkaline, and other salts, in solution, to counteract acidity and supply the necessary quality of food which otherwise would be wanting. The grass, however, owing to the decomposition of air being less (and consequently the produce of naturally-formed ammonia), is generally deficient of nitrogenous element, and therefore is better adapted for yielding butter than cheese or butcher-meat; but in practice this deficiency is easily supplied by the addition of a little pea or bean-meal and cake.

Like grass, the turnip delights in a rich, well-drained, calcareous soil, or one full of vegetable matter, with a moist climate, both top and bottom having a liberal supply of air. An abundance of pure air is essential for the growth of this invaluable plant; for without plenty of room, a well-pulverized soil, and an atmosphere free from deleterious matter, a heavy crop cannot be grown. At the same time more water appears to be assimilated in the process of vegetation than nitrogen from the atmosphere; thus proving that as the turnip is a large consumer of ammonia—a great decomposer of air and water—nitrogen-gas must be given off from its leaves.

With regard to climate, it is much more diversified than is generally imagined. In common conversation we talk of the north, south, east, and west, as cardinal distinctions; but when we come to examine the details of even a single province, let it be situate where it may, how different is the atmospheric circumstances of one farm from that of another! and how unlike are the results on animal and vegetable life!

Such diversities are to be attributed no less to geological than geographical causes. When we enter the field, may it not be said, How little is yet known of the "chemistry of common life!" for here the undivided labours of the farmer are directed to one continued process of decomposition! as if man had but one grand object in view—viz., to pull down as fast as Nature builds up the animal and vegetable kingdoms! Nor are results to be measured by his own individual efforts; for mechanical appliances without number are now being brought to bear upon the soil, exposing it more effectually to the decomposing influence of the atmosphere, in order to increase both produce and consumption.

This decomposition of the soil and its produce must affect the contiguous atmosphere less or more, and hence the quality of the crop. The smell of newly-ploughed land is sensibly felt, for instance, on entering the field, and from different qualities of soil it is equally different. From time immemorial, ploughmen have experienced certain localities more healthy than others; and the difference is obviously to be attributed to climate, as affected by the volatile matter given off in the process of decomposition.

We might here enter into a large amount of detail, quoting examples from different geological formations, did our limits permit; but this blank we shall leave our readers to fill up themselves. If they take up a clod and break it, they may easily detect what the smell or volatile matter given off into the atmosphere is composed of. Or if they can analyze it, they may also be able to say what will be liberated in the process of decomposition. All that we shall add is this—Were every farmer in possession of the analyses of the different qualities of soil he cultivates, and volatile matter given off in the process of decomposition, it would prove an interesting source of information to him; and when a few sovereigns would obtain it, why should it not be had?

The atmosphere, again, is sensibly affected by different crops, and that differently at different stages of their growth. Who has not felt, for example, the intoxicating aroma of peas, beans, and clover in flower? —the fragrance of the meadow during hay-making?—the pungent smell of turnips when growing rapidly?—and that of a field of barley behind the reapers or reaping machine in harvest? These, although prominent examples, are only a few of what experience is familiar with, and which might readily be quoted for the sake of illustration.

Our next topic is cultivation. How does it affect the influence of the atmosphere upon the soil and its produce?

With regard to the soil, it is only when accompanied with a sufficiency of moisture that the atmosphere can enrich it. If divested of water, the scorching effects of a summer's sun would render our fields as barren as the deserts of Arabia; but with the requisite supply of this invaluable fertilizer, the rays of the sun are powerful auxiliaries to the enriching of them. To "keep in the sap" and "out the drought," and yet admit the free circulation of the atmosphere, has long been acknowledged one of the cardinal points in good farming.

Deep culture and drainage, again, by increasing the capacity of the soil for holding air, add greatly to the means of enriching it. Probably more of the success of the Lois-Weedon system depends upon this, than to the mere fallowing of the "intervals" between the beds of wheat or other kinds of crop; so that the question may yet be raised whether equally deep culture, with proper attention to seeding the ground uniformly, may not produce equally beneficial results. But be this as it may, the chemical effect of air and water in a greater depth of soil is manifest from what has already been said; for the decomposition of the soil, air, and water (and hence the formation of soluble matter and ammonia) will be directly as this depth—twice the depth of ordinary cultivation by the plough producing twice the quantity of fertilising matter, while from the greater depth there will be less escape or waste of volatile substances.

The free circulation of air, again, access of light, and rays of the sun, among growing crops, are questions of equal importance. In this respect wide drilling is highly advantageous, while intervals may produce a more healthy and free circulation. But much of this will depend upon special circumstances; for clean flinty straw on the wide-drill system may admit of a freer circulation than coarse flaggy straw deficient of silica with wide intervals.

Many exceptions may no doubt be taken to the wholesale manufacture of ammonia, as advocated, from the nitrogen set free in the decomposition of air, uniting with the hydrogen of water when undergoing a similar process; but granting them to be true, the practical question in the field is obviously to reduce exceptions of this kind to the common rule. This may be done in various ways—as by draining; deepening the soil; adding clay, calcareous, and vegetable matter to sandy lands, to retain moisture and produce decomposition; sand, vegetable, and calcareous matter to clay lands, to promote the free circulation of the atmosphere, and its decomposition along with that of water; in short, anything which will promote the decomposition of air and water in the soil, so that the nitrogen and hydrogen set free shall be united so as to form ammonia. We see no other way of accounting for the extraordinary fertility produced by improvements of the above kind, than by working up the nitrogen and hydrogen set free in the process of decomposition into ammonia, or some of its compounds, as food for plants. The decomposition of farmyard manure in the soil, and even clean straw in clay lands, obviously works up the nitrogen of the atmosphere and hydrogen of water into matter more fertilizing than their own constituent elements will satisfactorily account for. The advocates of exclusive liquid manuring overlook the economy of decomposing vegetable matter in the soil, and the additional supply of ammonia derived from this source by means of the nitrogen and hydrogen liberated in the process.

THE GRADUAL IMPROVEMENT IN THE THRASHING MACHINE.

"Portable thrashing machines," wrote Loudon twenty-five years ago, "are very common in Suffolk; it being not unusual for an industrious labourer, who may have saved thirty or forty pounds, to own one worked by three or four horses. Reaping-machines and steam ploughing-machines will probably in a few years be owned and let out for hire in a similar manner." After more than "a few years," reapers and steam-ploughs have not yet attained a similar position with itinerant thrashing-machines, although rapidly coming into extensive adoption by large farmers. However, thrashing-machines themselves have taken a form that our author never anticipated: the portable steam-engine, and that marvellously compact piece of mechanism, the combined thrashing, shaking, winnowing, and finishing-dressing "drum," "barn-works" or "mill," having completely raised the character of agricultural machinery, and as a necessary consequence multiplied mechanical knowledge among farmers and their workmen. Directly it was proved that steam power could be advantageously conveyed from farm to farm, not only a higher velocity of the drum, and a greater amount of work in a given time was achieved, but the operations of straw-shaking and winnowing, previously confined almost entirely to thrashing machinery erected in buildings, were now added to the portable machines. As far as mere knocking out of the grain is concerned, we have now comparatively little to wish for, and may expect only slight improvements in augmenting the quantity done, economising the motive-power, avoiding splitting, and accommodating the beaters and concave to all conditions of "stuff." In the apparatus for separating the corn, chaff, and straw, considerable advances may yet be made; and as next July will try what our inventors and manufacturers can do for us in this department, it may be well for farmers to devote some consideration to it beforehand.

One of the earliest ideas in connexion with thrashing by machinery was that the separation of corn, chaff, and straw, should be effected, as well as mere shelling out the grain from the ear. Thus Michael Sterling, more than a hundred years ago, applied the principle of flax-hulling to beat out corn, in a machine consisting of a vertical shaft carrying arms or blades revolving in a cylinder—the corn being fed in at top, and the straw and grain separated by riddles and fanners underneath. This was thirty years before the invention of the drum and beaters by Meikle. In 1789, three years after Meikle's first machine was constructed, with a drum of four scutch-beaters and a pair of feed-rollers, the first machine having a circular rake attached for shaking the straw, and fanners below for cleansing the grain, was erected in Northumberland. In 1795, Wigfull, of Lynn, in Norfolk, patented a machine in which the corn falling from the drum was carried by means of a shaking screen and rolling-cloth or endless web to the blast of a fan, where it was separated from the chaff. Of course our space will not permit us to chronicle here all the successive improvements in thrashing machinery; but these instances show how ancient is the addition of shaker, riddle, and fan, which we are still labouring to improve. The straw-shakers of the old Scotch machines are generally known as being large drums, armed with rakes, revolving above fixed curved racks or screens, over which they pass the straw; some machines having one of these drums "overshot," and furnished with brushes as well as rakes or forks. The separating apparatus consisted of a couple of winnowing-machines underneath, similar to those made for hand-power, catching the grain and chaff from the drum and shakers by means of a large deep hopper.

The parallel-motion shaker, so much in favour now, appears to have been invented in 1840, by Mr. Morton, of Whitfield Example-farm, and erected as part of the steam-thrashing machinery there by Mr. Clyburn, of Uley Works. It consisted of parallel spars of wood, 6 feet long, and three-quarters of an inch thick, with three-quarter inch spaces between them; these being joined together in two alternating sets, were jumped by double cranks on two revolving shafts, as our present box-shakers are. This was about the first time that straw was subjected to a real "shaking." Other parts of this machinery were equally ingenious. The corn fell before the blast of a fanner, then down before another; the light grain and short straws thrown out by this first winnowing being taken up by an "elevator" again to the feeding-board of the drum. The winnowed corn was carried up by other elevators to another winnower, or rather two, one under the other, with two fans, and was finally again elevated to the sacks, or passed through a "barley-hummeller." An endless web was tied at the mouth of the drum, to carry the unthrashed straw gradually to the beaters. Since that time, this web has been abandoned; another first winnower has been added, fed by an endless web beneath the drum and shaker; and the corn after falling before the first blast is sifted sideways into the hopper of the two lower dressing-machines; and a horizontal cylindrical sieve or "separator" was also applied. The idea of adapting winnowing apparatus to *portable* thrashing-machines, carried into effect by the Lynn machine-maker, in 1795, was revived just half a century afterwards. Earl Ducie exhibited at the Southampton Meeting, in 1844, a "recent and scarcely completed machine," the invention of Messrs. G. Parsons and R. Clyburn, which Mr. Miles reported as being "truly original." At Shrewsbury, in 1845, this machine was driven by Dean of Birmingham's portable engine, itself a great novelty, and awarded a prize of £10. It thrashed, cleaned, and finally sacked the grain; and Mr. Parkes in his report said, "It is a powerful machine, and possibly adapted to the very large rather than to the moderate-sized farm." In 1846, at Newcastle, a thrashing-machine was exhibited by Cambridge, having a reciprocating rake attached, for the purpose of collecting and passing the straw from the drum without harbouring the grain; and the lower part of the machine was inclosed so as to form a box or receptacle for the grain to fall into. But up to a year later than this period we find that improved horse-power machines without dressing apparatus occupied the most prominent place in the catalogues of the great makers; while hand-power thrashing machines were much in request as novelties. At Northampton, in 1847, Hornsby showed a thrashing-machine with a revolving shaker; Cambridge one also with, a shaking apparatus attached; and J. Cornes, jun., of Market Drayton, a thrasher with straw-shaker and elevator, the shaker six feet long; Hayes, of Elton, had a straw-shaker; and Clyburn exhibited a horizontal cylindrcal "separator." Ryland and Dean, of Birmingham, however, showed a complete machine for thrashing, winnowing, and bagging the grain. At York, in 1848, Hornsby had his improvement of Clyburn's shaker; Summers, of Wold Newton, a rotary straw-shaker; Scott, of Belfast, a revolving-rake shaker; Humphries, of Pershore, a thrasher with winnowing appraatus and shaker; Garrett, a thrasher with straw-shaker and jogging screen for separating the colder and refuse from the grain; while Abbey, of Dunnington, exhibited a horse-power thrashing-machine with blowing-case, riddles, and elevators which filled the sacks with corn; and Burrell, of Thetford, gained a silver medal for his portable thrashing and dressing machine with parallel-bar shaker, invented by W. Palmer, of Southacre, capable of thrashing five or six quarters per hour, and delivering the corn, chaff, straw, and siftings or short straws in separate places. The price was only £75, yet the machine was at that time supposed to be very cumbrous for ordinary farm use. At Norwich, the next year, Clayton and Shuttleworth produced their box-shaker, three feet wide, and fourteen feet long; Crosskill, also had a shaker, "on a new principle"; Hornsby showed a double-cranked or jumping straw-shaker; and Sargison, of Wisbeach, a shaker having sieves or riddles of perforated galvanized-iron, which propelled the straw and pulse forward, while the grain sifted through. In addition to Burrell's thrashing and dressing machine, Cambridge showed one invented by Humphries, for thrashing, winnowing, and weighing; Holmes, of Norwich, a horse-power machine with a newly-invented jog colder riddle, and a new straw-shaker; Garrett, a thrasher with chaffing apparatus; and Ferrabee, of Stroud, a machine with double-crank shaker, and an endless band for delivering the corn and chaff to and elevator which carried it to an ordinary winnowing-machine. And it is noticeable that the manufacturers felt it necessary to call attention to the fact that their portable machines for doing all this work at once did not require to be removed from the carriage-wheels on which they were mounted. In the *Farmer's Almanac* for 1850 appeared the first engraving of a portable combined thrashing-machine, viz., Garrett's; the shaker consisting of spars with spikes rotating upon cranks at the inner end and vibrating on rocking-bars at the other. About the same time came out Clayton and Shuttleworth's portable combined machine; the shaker-boxes having a parallel motion, by means of wheels and spindles connecting the crank-shafts, instead of connecting-rod and cranks as before; and there was a vibrating trough extending the whole length of the machine. Tuxford's table shaker-off was also introduced; at first having a rotary jumping movement by means of mitre-wheels and a spindle connecting two crank-shafts underneath, instead of hanging on slings as at present.

It is only six or seven years, therefore, since we obtained the portable thrashing-machine in its present form; that is the vital parts which are now being improved and altered (but still generally adhered to) in every possible form. We may mention as one of the greatest and most extensively-adopted improvements, Humphries' divided and reciprocating trough or shoe; and as variations from the common form, Ransome's revolving Brinsmead shaker, and Hornsby's worm or screw for feeding the riddles.

THE INCRUSTATION OF CEREAL AND OTHER SEEDS.

By F. R. de la Trehonnais

I.

Formerly, when science was still in its infancy, experience to a certain extent, but routine especially, were the only guides of agriculturists in their modes of preparing the ground for the reception of the seed. Farm-yard manures and bare fallows were the only means of restoring the spent energies of the soil; and these were then, and are even now to a great extent, indiscriminately resorted to, without any regard to the chemical constitution of the soil, or the requirements of the plants that are to grow upon it. Analytic science, and the wonderful discoveries of vegetable physiology, have of late years thrown a great deal of light upon the subject of manure, its mode of application to the soil, and its assimilation by the plants. And yet, practically, little progress has been made. We have superphosphate, it is true: we see a great many kinds of artificial manures daily advertised in our agricultural papers; but, after all, the progress we have accomplished is by no means adequate to the strides which science has made in the analytic knowledge of manures, in the exact appreciation of their fertilizing qualities, and their action upon vegetation in various plants. We still cart away to our fields the same ponderous loads of farm-yard dung, a large per-centage of which is of no earthly use, and can only be regarded as the huge vehicle of a very minute proportion of ammonia and alkaline salts. Even guano and superphosphate of lime are encumbered with a large proportion of useless ingredients, all of which are costly to purchase and cumbersome, and therefore expensive to carry. Besides, what a large proportion of the manure which we lay over our fields is utterly lost to the crop we want to grow! what a large per-centage is eaten up by noxious weeds, or disseminated through a part of the soil untouched by the ramifications of the roots, and therefore immediately useless! On the other hand, we know, from clear demonstration, what the substances are which each kind of crops draws from the soil; we know to a fraction the quantity of each of those substances respectively; and when we come to compare their aggregate weight at per acre, with the quantity of manure which we have laid over that extent of ground, we are astounded at the difference in bulk and weight.

II.

If a plant is dried and burnt, the little pinch of ashes that remains, after complete combustion, represents the amount of mineral substances which the plant has drawn from the soil. The rest, which has evaporated in the air by the process of combustion, represents those constituent parts which the plant has derived from the air. Chemistry tells us exactly what substances the ashes contain, and in what proportionate quantities. It is then obvious, that either the soil or the manures put on it, or, as is more generally the case, both combined, have supplied those substances to the plant, without which it could not have arrived at maturity. But here we may well pause, and ask ourselves whether, in order to administer to the plant so small a quantity of matters—another and a more simple mode cannot be found; for that quantity, though it be multiplied by the number of plants in an acre of ground, still remains comparatively minute in the extreme, when we compare it with the bulk and weight of the 20 or 25 cubic yards of dung we have laid over it, besides the pulverulent artificial manure or guano we have drilled with our seed. Again, if we calculate the cost of that manure and the value of the labour which its use has necessitated, we find that the little heap of ashes which has been the result, has cost us an immense sum of money; in fact, a much higher sum than the pure chemicals of which it consists could be bought for in the trade.

III.

Hence, the general tendency of efforts on the part of both scientific men and practical agriculturists towards concentrated manures, that is, diminishing the bulk of useless substances, serving merely as vehicles to the really fertilizing element, in order to render them more portable, and more energetic, proportionately with their bulk. Abstractedly, this is evidently the goal of our progressive ideas in agriculture; that is, the simplification of all the means, either in labour or manures—the one by concentration of fertilizing energies; the other by means of ingenious machinery, and especially the use of steam-power in field as well as barn operations. It is true to a certain extent that, apart from the primary purpose of restoring the exhausted fertility of the soil, stable and other bulky manure have other advantages, mechanical and thermal; for instance, in dividing a stiff soil, and imparting to it a higher temperature by decomposition from fermentation. But, with thorough drainage, these advantages have become less depending from the action of stable manure; and I have no doubt but, as we progress with time, the corn-growing farmer will no longer be obliged to have recourse to the present troublesome and expensive mode of manufacturing his manure. A more definite delineation will divide the operations of the corn-growing from those of the breeding and grazing agriculturists, by which the pursuits of the farmer will become less complicated, demanding a smaller capital, diminishing his risks, and materially adding to his gain. Every farmer in England knows well that the lean stock he is obliged to feed on his farm brings him no immediate profit; and, were it not for the manure, he would incur a positive loss—setting for nothing the labour, anxiety, risks of mortality, and the locking up of capital, which the feeding of lean stock entails.

IV.

From the foregoing preliminary observations, we are naturally led to ask the question, How are these disadvantages to be removed? How are we to turn scientific discoveries to a practical account? How are we to concentrate our manures, and simplify their fertilizing constituents, so as to reduce them to the bulk of the amount actually assimilated by the crop; and, having succeeded in this, how are we to apply them?

A few weeks ago I communicated to this paper the translation of a very remarkable memoir upon the nutrition of plants, by the celebrated Boussingault, describing a series of experiments which clearly demonstrated the possibility of enabling a plant to accomplish all the phases of its existence, viz., its germination, normal growth, bloom, fructification, and maturity, in pure calcined sand, in which were introduced pure phosphate of lime, vegetable ashes, and nitrate of potash, which contain the mineral constituents of the plant selected for the experiment — *Helianthus argophyllus*. Here, it is very obvious that the soil was essentially used only as a vehicle to the plant wherein it might strike its roots, and also to the ingredients which were added as food for its development and maturity. So it matters not how destitute of every nutritive element a soil may be, if it do not contain any substance noxious to vegetation—provided it can be supplied with the constituents of the plant which is to grow from it. If those constituents may be so placed in close proximity to the roots that they may be all absorbed by the plant in the course of its development, there is no necessity of placing in the soil a larger quantity than will be assimilated by the plant. In other words, if the analysis of the ashes of the plant shows that it has absorbed, say ten grains of the various elements added to the soil, and, in respective quantities, if it were possible to introduce those substance in so close a proximity to the roots that the whole might be integrally assimilated, there is no doubt but the mere addition of exactly ten grains of the mixture, in the same proportion as found in the ashes, would be quite sufficient to insure the normal development of the plant.

It must be admitted, however abstract the foregoing proposition may be, that if the principle it propounds could be practically applied, it would be the very limit to which progress can attain; and as I have already remarked, it is impossible not to perceive that it is to that concentration and simplification of means that we are now directing all the efforts of our skill, knowledge, and ingenuity.

Boussingault, in his recent experiments in the production of what he calls a *limit* plant, has proved that the seeds of many plants contain the necessary quantity of nitrogen, not only for the germination of the plant and the nutrition of the nascent stem and leaves before the radicles have been sufficiently developed to draw a supply from the soil, but also to the production of a perfectly organized plant, though exceedingly reduced in its dimensions. In fact, such a plant—after several months' existence in the open air, or even in a confined atmosphere—has been found to weigh but very little more than the seed from which it sprang. This clearly shows that the extent of the organism of that plant was limited by the quantity of the nitrogenous principles contained in the seed; but as soon as he applied to the soil (exclusively composed of calcined quartz sand, not containing a particle of decomposed matter or mineral manure) a small quantity of phosphate of lime, nitrate of potash, and vegetable ashes rich in silicate of potash, the plant immediately sprang up from its torpor, and grew luxuriant and strong, bloomed, and brought forth matured seed as well and as rapidly as another plant of the same kind had done upon a garden-strip richly manured.

This experiment clearly shows that the soil upon which the plant grew exercised no immediate influence whatever upon the growth of the plant, as far as its nutrition went, but merely as a vehicle for heat and moisture, as well as the holder of the plant and of the pure mineral salts upon which it lived and developed itself. This naturally leads us to ask the question, whether, instead of incurring great expense and trouble in manuring the soil thoroughly with heaps of dung containing but a small percentage of fertilizing matter, which is still reduced and less available to the plant by being disseminated over a larger surface than the roots of the plant can possibly compass, it be not possible to manure the seed itself, that is, surround it by a crust formed of the very mineral substances which are necessary to its growth, in the same proportion as they are found to exist in the seed, and in a sufficient quantity to represent exactly the weight of the aggregate mineral substances which are abstracted from the soil by the well-matured normal plant? This crust could then be considered as the mere extension of the seed to a larger bulk; and as the seed contains what is necessary to feed germination, and even to form a complete plant, though limited in weight to the extent of food contained in the seed, so the seed being increased to any required number of times its size and weight by the agglomeration of substances, such as phosphates, nitrates, and silicates, would be enabled to supply to the growing plant the necessary elements of normal growth and perfect maturity.

VI.

This is indeed no new theory, and many have been the attempts even in times of remote antiquity to realize it in a practical manner. Many are the inventors of wonderful liquids, in which the seeds were to be steeped, and thereby imbibe all the required elements of nutrition and fertility. All these have failed, not because the principle was not a sound one, but because it was not properly applied. For it is obvious that a liquid manure, however rich in fertilizing elements, could not fix these round the seed in a sufficient quantity so as to increase its store of nutritive matters—this can only be done in a solid form. Then, until very recently there was also the insuperable difficulty arising from ignorance, science not having yet shed the light of its discoveries on the mysteries of vegetation; and the wonderful action of phosphates, nitrates, and silicates upon vegetation, although practically known, had not been determined with sufficient minuteness and accuracy to lead to anything like an authentic formula of proportion and quantity. But failures, however complete they may be, in carrying out great ideas, are no arguments against a renewal of efforts; and when those failures, as in the case of steam-engines, railways, reaping-machines, or the application of steam to the cultivation of the soil, are found to act rather as incentives to the ingenuity of men, instead of damping their energy and the buoyancy of their hopes, we know it from the experience of the last thirty years that it is a sure sign that the idea is good, and will be ultimately carried out.

VII.

But there are objections to this system. What system is free from objections? Some say that the mineral matter with which the seed is enveloped, on being dissolved in the soil, will settle immediately around the neck of the roots, which will naturally dive away from it, and it will then become useless to the progress of the plant after it has attained a certain development. I believe that this objection is more specious than real; for every one must have observed that when a seed has fallen upon a manure heap, and there germinated to a plant, if that plant be pulled up, it is found that the roots are very short and shaggy, and do not seem to have penetrated beyond a very limited area, the number of rootlets making up for the deficiency of their length. This seems to me easily accounted for; because the roots, finding in their immediate vicinity a sufficient supply of nutritive elements, have no inducement to dive at any great length in search of them. The instinct displayed by the roots in search of food is truly wonderful, and many examples of their astounding sagacity might be adduced. I have read somewhere the instance of the radicle of a plant diving to the depth of many feet, and fixing itself into a bone that was buried there, and in search of which it had evidently dived at so unusual a distance from the surface. It is not, therefore, unnatural to surmise that the roots of the plants, finding within their immediate vicinity *all* the nutriment required for the plant whose mouths they are, quietly settle in that spot, and contentedly relinquish their erratic propensities.

VIII.

However plausible this and other objections may be, the best test, after all, is the test of experience; and that system, which I have called, for want of a better word, the incrustation of seeds, must live or die by that great test. A French gentleman has recently come to this country, to submit his invention of a machine for preparing the seed, and the formulas regulating the nature, proportions, and quantities of the mineral substances to be used, to the verdict of English practical farmers; and I am in a position to state that his appeal has been favourably received, and experiments are being made in various parts of England with the view of testing the value of that gentleman's discoveries. Messrs. Burgess and Key have been entrusted with the construction of the simple machine for the incrustation of the seed. This machine consists in a hollow cylinder, suspended by two leather straps from a pulley, to which a rotary motion of about forty revolutions in a minute is imparted, either from a steam-engine or any other motive-power. In the cylinder the seed is introduced mixed with an agglutinous mixture, itself rich in nitrogen; and then the mineral substances, reduced to a fine powder, are added, and from the rotary motion of the cylinder adhere to the seed in a regular coating; this is repeated until the entire quantity has been fixed. In order to prevent the humidity of the agglutinous mixture from acting upon the seed, and causing it to germinate before it is put into the soil, an hygrometric substance is mixed with the mineral powders, which abstracts all the excess of humidity from the glue, and besides dries up the crusted seeds almost immediately.

Previous to his coming to this country, Mons. D'Illiers has satisfied himself by numerous experiments of the value of his discovery; and at the late sowing season, a large area has been sown with his prepared seed in various parts of France, so that at the time of next harvest I shall be enabled to give an authentic account of experiments tried both in France and in England, under every variety of local circumstances of soil, climate, and modes of husbandry.

Norwood, Jan. 8, 1858.

LAND DRAINAGE—ITS ACTION AND EFFECT.

In a former article we pointed out the discrepancy of opinion that existed upon the practice of draining, and we concluded our observations by stating a few leading principles that appertain to the subject. We may pursue these with advantage a little further.

As a surcharge of water in any description of cultivable soil must at all times be injurious, it becomes absolutely necessary that it be discharged as quickly as possible; and as the amount of rainfall is different in different portions of the kingdom, the means applied must have relation to the quantity to be discharged by the drains. Consequently, in districts where the rainfall exceeds 30 inches annually, the means resorted to for its removal must be in relation. The permeability of the soil also forms a strong consideration: the more retentive it is, the nearer together must the drains be placed; and *vice versâ* the greater the porosity of the subsoil. The depth of the drains will depend upon the nature of the upper soil and substratum: if exceedingly retentive, and only slightly permeable, then the depth of the drains must be compensated by the distance betwixt them. On such soils drains of 30 to 36 inches in depth will be found sufficient, the distance between varying from 15 to 20 feet; but when the substrata become more permeable, the depth of the drains should be increased, and the space between them extended. It rarely happens, however, that any soil affected by surface water requires drains more than 48 inches in depth, or will allow a distance of more than 30 feet apart. This may be accepted as a principle necessary in application, upon soils affected only by what is termed *top water*, or such water only as is supplied from above. Upon the permeability or impermeability of the substratum the application must invariably depend; but as many drainers contend that all soils are more or less permeable, it may be well at once to advert to that point. To a certain depth it undoubtedly is the case; but frequently at a depth of 18 inches some of our strongest clays become impermeable, unless for short periods after excessive drought, when, by their having shrunk, fissures have been formed by which water becomes freely admitted, but which, when again saturated, become impervious to the further admission of water. Or, as is the case in many tenacious clays, small veins of *silt* exist in stratified order, and accomplish the object of allowing the water to pass off slowly by their assistance. Professor Ansted, in speaking of the London clay, says, "It is tough, and of course impermeable;" and this has been proved over and over again to be correct.

Much of late has been advanced upon the benefit to be derived by not allowing any of the rain water to be carried off by surface drains, but that the whole of it should be admitted, and pass through the soil to the drains below. The argument advanced in favour of such a practice is assuredly carried too far. It is true that rain water contains some fertilizing properties, more especially as regards the ammonia and nitric acid that become combined with it, but which, at all times minute in quantity, during very rainy seasons exist in the smallest perceptible proportions. Whenever these enter into and become combined with the soil, they are by their affinity immediately taken up by it, and retained to be given out to plants vegetating upon its surface. The greatest amount of injury sustained by soils surcharged with water arises from the exclusion of air and the lowering of its temperature, as well as by the admixture of mineral ingredients with it, which become injurious to vegetation. Air contains substances equally beneficial to vegetation as those contained by rain water; those properties in the latter, before referred to, being taken up in its passage through the air as the rain-water descends to the earth. After long periods of drought, when the air has become highly charged with those substances, the quantity brought down by the first shower that falls is far greater in amount than what is brought down by the next and succeeding showers. In long continuous seasons of rain it ceases altogether. As it is during such seasons that a surcharge of water to the soil becomes most injurious, it is at once apparent that, if a large portion of this matter can at once be carried off from the surface, the necessity of an increased area of drainage below may be dispensed with, especially in districts where the amount of annual rainfall is greatest.

Water in a state of evaporation from a surface discharges the heat also; and, therefore, if no other means exist whereby water can be discharged from the soil, it must remain until sufficient heat is produced by the rays of the sun, or by increased temperature of the atmosphere upon the surface to again convert it into vapour. During this process the heat of the soil becomes diminished, especially at the immediate surface; and a soil of a district of naturally higher temperature is reduced to the temperature of one of higher latitude or elevation. This effect has, however, been greatly exaggerated. It has been recently computed that the heat lost in the process of evaporation by the sun's rays an inch-fall of rain would be sufficient to reduce the temperature of the soil, to a depth of ten inches, no less than 99 degrees! The more porous the soil, the more rapid is the evaporation; and consequently we have an explanation why crops upon gravelly subsoils become most affected in the early spring months, and at the same time arrive at a remedy in relieving them from surplus water by drainage. The radiation of heat from a surface coming into contact with vapour discharges the heat at the immediate point of contact, and explains the cause of hoar frost when the thermometer shows, at a few inches from the surface, no frost actually existing. The drainage of land, therefore, by lessening the amount of evaporation from the surface, consequently lessens the discharge of heat from its surface, and thereby benefits vegetation.

The third point to be referred to, is the injury sustained by plants whenever mineral substances, entering into combination with water stagnant in the soil, rise to the surface, and become injurious to vegetation. This more especially takes place upon soils highly charged with peroxide of iron, which most soils in a greater or less degree contain, especially those wherever the subsoil is of a red colour. To such an extent does this frequently exist, as to tinge the water passing through it with this red colour, and its deposit,

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AGRICULTURE IN CHINA.

HONGKONG, NOVEMBER, 1857.—A revisit to the scenes of the Canton River has impressed me still more not only with the extraordinary beauty of the scenery upon its banks, but also with the singular geological formation of the country. Upon a first view, especially if the attention is absorbed by warlike operations, one does not observe the general coincidence in character between the district of the Pearl River and that of the Yang-Tse. We are struck rather by the points of difference. In the one the eye meets at every point ranges round-topped granite hills; in the other the vision wanders unchecked over a dead flat. Yet both are enormous deltas of alluvial soil, through which the internal waters descend in one large river and a thousand streams. In the north the deposits were spread upon the level bed of a great sea, and silted it up into a solid plain; in the south the rich mud was brought down into an archipelago of granite islets, drove out the sea, and produced a region of rich valleys intersected or dominated by granite mountains. The crops we see upon the banks of the Pearl and upon the banks of the Wangpo owe their luxuriance to the same alluvial qualities of the soil. On the Canton River they are just now gathering their second crop of rice, the bananas are still clustered upon the trees, and the patches of sugarcane look green and reedy. I should have been glad of an opportunity of examining the agriculture of the south more nearly. Three Englishmen at Hongkong resolved, in the spirit of Chevy Chase chivalry, to hunt, or rather to shoot for three days upon the enemy's territory. I was to have accompanied them, but was drawn away by the more imperative duty of accompanying the reconnaissance up the river. On my return I found they had accomplished their vow. Bristing with revolvers and accompanied by five Coolies to each man, they had landed at Mirs Bay, passed through several villages, beat with pointers and beaters the hills overhanging the battlements of a walled city, and, in spite of angry looks and muttered maledictions, had returned with whole skins and a bag of 16 pheasants and some quail.

The best way to see the agriculture of a country is to shoot over it. A landlord who shoots over his estate knows the rotation of crops in every field, and his tenant will not wisely be too persistent in his straw crops. With a view to this same sort of minute acquaintance with the agriculture of the flowery land, I employed some of my enforced leisure at the north in little expeditions after the China pheasants. I used to take a Soochau boat, and go away up the rivers and creeks, some 20 or 30 miles, and anchor off some likely spot for the night. Next morning my servant went to the nearest village and hired three peasants with long bamboos, and we went forth scouring the country. There is no game law in China. The land is free to all, and consequently the result was not great sport. Moreover, every inch of ground was covered by some standing crop, and I had no dogs. Hospitable as the Shanghai folk are, they do not like lending their dogs, and I sighed in vain for my faithful four-footed friends. The only resource was to try whether the habits of the wild pheasant of China, which has cost no one a guinea to preserve, are the same as those of their more costly brethren of England. I used to steal in early morning, and again just before sundown, to the sides of the bamboo plantations. The ground round these plantations, which are always attached to houses, is cultivated in lands, like allotment grounds in England—a land of cotton, another of peas, a third of indigo, a fourth of white turnips, and so on. But in China, as in England, the pheasants are not easy to approach at feeding time. I seldom got a shot at less than 70 yards, and if I brought down my bird "a runner" he was lost to me and my heirs for ever. The fields were all alive with sharp-eyed *indigenes*, who watched the course of the wounded game, and followed it up when I was gone. In the daytime I had a very numerous following of spectators, and I shot many birds of curious plumage for their amusement and for the satisfaction of my own curiosity. It was very critical shooting. It was scarcely possible to point your gun without finding a Chinaman at the end of your barrels; and if you peppered one of these spectators or cotton-pickers by accident, you would be bound up in bamboo thongs and sent to Shanghai in a cage. Altogether, therefore, the October shooting in China is not quite worth following for itself alone. But for the exercise, and as an excuse for exploring the country, it is greatly to be cultivated, and the birds, when you do get them, are very handsome. All the cocks have the white ring round their necks, and, strangely enough, the cocks get up more freely before you than the hens.

After investigation carried on with these opportunities, I am convinced that England has nothing to learn from China in the art of agriculture. It is true the Chinese have no summer fallows; but then they have no stiff clays. They have no couch grass, no thistles contending for the full possession of the land, as we see in Wales; no uninvited poppies, no straggling stalky crops, the poverty-stricken covering of an exhausted soil. At rare intervals we see a large rich-coloured cock's-comb flaunting himself among the cotton; but, generally speaking, there is not a leaf above the ground which does not appertain to the crop to which the field is appropriated. Rice and cotton are the staples of the great district of which I am now speaking. These crops often extend in unbroken breadth over tracts of thousands of acres. The peas, and wheat, and indigo, and turnips, and bringalls lie in patches round the villages. The ground is not only clean, but the soil is so exquisitely pulverized that after a week's rain I have sometimes looked about in vain for a clod to throw into a pond to startle the water-fowl.

We may be accustomed to mark the course of agriculture throughout the breadth of our own land—the light loams of our Lincolnshire wolds, the turnip and barley lands of Norfolk, the strong flats of Suffolk; then westward to the rich pastures of Leicester, the mixed dairy and arable farms of Derbyshire, across the coalfields to the successive and attenuating oat crops on the shores of Bala, and down the valley of the Tivey—yet we shall see nothing like the cultivation of this great plain of China.

The art is exercised under different conditions. The Chinese cultivator is not asked for milk, or butter, or cheese, or mutton, or beef. The Chinaman does not object to a little buffalo or goat's milk with his rice; and if some curious accident should have brought buffalo flesh into his basin, he will eat it. But he rarely or never buys it. In his recent voyage of discovery up the "Great Junk" or "Great Western River," Commander Elliott and Captain Edgell saw droves of buffaloes upon the uplands to the north of Canton, and we know that milk and mutton are common food in Tartary; but I am speaking of those parts of China where agriculture is supposed to reach perfection, not of the mountain pastures. Pork, poultry, and vegetables, and the creatures that swim or crawl about his rivers and canals, are the Chinaman's natural dainties. Stall feeding, therefore, would not pay even so moderately (taking sale of stock only into consideration) as it does with us, and grass is only seen growing rank on graves. One or two buffaloes to turn the irrigating wheel and plough the paddy fields, two or three goats, a breeding sow, a quantity of those ugly, long-legged fowls so ignorantly called "Cochin-Chinas" in England, and a flock of ducks and geese—such is the live stock of a Chinese farm which maintains a hundred labourers.

Stable-yard manure, therefore, is scant. Nor is it much coveted. Human ordure is, in a Chinaman's opinion, the only perfect fertiliser. This is collected with the most oppressive care. In the cities and in the neighbourhood of cities enormous dark open earthenware pans offend the senses at every town, poisoning the air, inviting, and too often receiving, the contributions of the passers-by. The privilege of collection is sold for a large price, and the Cantonese have a proverb that a fortune every day passes in that form out of their gates. In the suburbs every cottage has its open earthenware cesspool. In the country every house has its public latrine, ostentatiously placed with its open doorless entrance to the public path. In these temples the Chinese worship with a deliberate solemnity which savours of the ostentatious performance of a religious rite. The numbers and suffocating effluvia of these opposition manure-traps are to an Englishman a never-ceasing horror. They constitute his first and last impression of the country. Like everything else in China, the favour awarded by law and custom to the collection of manure is used as a contrivance for extortion. At Ningpo two immense pans lie opposite to the entrance-door of the first native merchant in that city, awaiting the payment of 2,000 dollars, which is the price of their removal. The boats which convey this produce through the inner waters will bring up close to you at night, and will remove only for a consideration. I knew an Englishman at Shanghai who was obliged to pay 30 dollars upon one occasion of this kind; but then he, in Britannic fashion, had knocked the extortioner into the midst of his liquid cargo.

These details of the "sordida rura" are not pleasant to write; at all times "difficile est propriè communia dicere," but if the object be to depict or to comprehend China, they must be written and read. This manure is sprinkled over the plant. It is too precious to be worked into the ground. The straw and the burnt hulm of the cotton plant are returned to the soil—that is all. The Chinese transplant every root of rice by hand, just as we should transplant young trees, and each has its little blessing of liquid manure as it is sown. This homœopathic system would not do, I apprehend, with our hungry clay lands.

The art of agriculture is, I repeat, exercised under different conditions in China to what it is in England. Give an English farmer a thousand acres of vegetable loam of an unexplored depth—a reticulation of waterways, which enables him to flood at pleasure every acre of his soil—an unfailing supply of manual labour at 4d. a day—and cheap communication, by tidal creeks, with large markets; give him also periodical rains, perfect drainage, and abundance of quickly ripening sunshine, and see what crops of corn and pulse and pot-herbs he would produce. I say nothing of tea, and cotton, and mulberry leaves; for our friend Giles would have to scratch his head a little before he could start on a race to overtake these Chinamen, who are 4,000 years of practice a head of him.

But then, *per contra*, it must be recollected that this park of Ceres is infested by poachers. These happy fields are overrun by extortionate mandarins, pillaging soldiers, marauders, who in small bands are called robbers, and in large bands aspire to be rebels and to be led by "kings," river pirates who levy blackmail, and occasional swarms of locusts which darken the sun. Simple folk may chatter about the horrible injustice of coercing the governing powers of China: but a Government which exacts and does not protect is only a badly-organized brigandage. I see no act of duty in rescuing a fly from a spider or a sparrow from a hawk, yet I do not regard either deed as unlawful. Quite sure I am that the larger interest of humanity would be subserved by any train of circumstances which should bring the Chinese population to comprehend not only our Western notions of probity and honour, but also our Western habits of working those notions into practice.

A curious instance has just occurred of the promptitude and ingenuity with which the Chinese seize upon occasions for extortion. Rumours had reached the ears of the Admiral that some Chinamen were levying contributions in the towns and villages on the banks of the river, and that they were doing so in the name of the English fleet. Commander Fellowes, in the Cruiser, accompanied by Mr. Wade, chief of the interpreter staff, were sent to inquire into this. These officers, with a small force, landed and proceeded from village to village, prosecuting their inquiries under much discouragement, for the suspicious inhabitants apparently imagined that the collectors of the barbarian tribute were come among them. It was only by slow degrees that Mr. Wade gained some credit to his declarations that he was not come to "squeeze." Then the quick eye of the Commander detected a rowboat, built to imitate a man-of-war's boat, but having points of difference enough to show a seaman that it had been constructed by Chinese hands. Soon afterwards Mr. Wade's attention was attracted to a notice posted in one of the more remote villages, and purporting to proceed from the honourable English nation. This proclamation stated that some of the husbandmen had not paid the regulated grain-tax due to the English fleet for protecting their crops, and threatened the defaulters that if the amount were not paid upon a certain day the ships would commence firing upon the villages. Following up this clue, the exploring party at last found that there was a society calling themselves the "Hall of Patriotism and Peace," who were in active collection of this tribute money; and that they actually had a prison well filled with victims within musket-shot of the ships. Of course, the prisoners (six of whom were found loaded with chains) were set at liberty; and the Admiral has circulated a notice in Chinese, disavowing any connection with such exactions. It was believed, however, that the Chinamen who contract to supply the fleet with provisions were at the head of this society; and subsequent inquiry discovered that there was a small fleet of row-boats, some got up to imitate English boats, and others having Chinese equipments and mandarin banners, which lurked by day in the creeks and came out at night. These boats all belonged to the "Hall of Patriotism and Peace," and they levied contributions alternately in the name of each of the belligerent Powers. The grand master of this lodge has been treated to four dozen lashes, and has had his head shaved; but he is no Chinaman if he will not incur a similar flogging for a similar object to-morrow.—*Times*.

FUNNY RAT TRAP.—A correspondent of the *Genessee Farmer* relates the following funny way of catching rats:—"I build my corn crib on posts about eighteen inches high, made rat-proof except at one of the back corners. Here, where they will like it best, make a nice hole with a spout five inches long on the outside, where they can go in and out and eat at pleasure. Then, if I think the rats are too numerous, I take a bag, after dark, and slip the mouth over the spout on the outside of the granary. Then send "Ben" in at the door with a light, and the rats and mice will run into the bag. Then slip the bag off the spout, and slap it once or twice against the side of the granary. Turn out the dead, and in an hour or two repeat the process. After all are killed, stop up the hole till new recruits arrive, which catch the same way."

THE IMPLEMENTS OF THE FARM—TO IMPROVE OR INVENT.

With reference to the implements succeeding the plough, which still further pulverize the soil, and which finish its surface, as the clod-crusher, the Norwegian harrow, and all the varieties of this important class, it is difficult to estimate in what direction further improvement must be made in their arrangement or construction so as to produce better work. What they have to do is done with admirable precision, so that although minor improvements may be made, no great revolution in their style of working can be reasonably expected. The remedy may be found yet further on. We are quite aware how ungracious is the task of "finding fault;" and having apparently done so much in this way already, if we still continue doing so, we shall doubtless be set down as utterly and in all things heterodox, and as continually indulging in dreams Utopian. But at the commencement of our articles, the task we set ourselves was one which had for its main object the endeavour to point out the probable direction in which agricultural mechanism was likely to progress; and to trace the impulses, if any, which tended to drive men's thoughts out of the long-maintained track of wont and usage. In following out this task, we have not been desirous so much to set before our readers our own notions on the subject as those of others. We have, in truth, been mainly attempting to become the exponent of what "men have been and are now thinking" on the all-engrossing subject of agricultural progress, and our remarks therefore must be considered in this light, rather than as the result of personal convictions.

To come, then, to our rather startling conjecture—namely, that this class of implements now under consideration may be, at some period more or less remote, rendered unnecessary. It may seem strange to some to doubt that clods and hardened nodules of soil are natural concomitants of the cultivated soil. Some do doubt this nevertheless, holding that these defects in cultivated soil are simply caused by defects in the system by which it is cultivated; so that if the soil was properly prepared, these defects would have no existence. Mr. Stephens, in his work explanatory of the "Yester Deep Land Culture," has the following:—"Many of the most costly implements employed on farms, such as Norwegian harrows, Crosskill's clod-crushers, grubbers, rollers, are only used for pulverizing the soil. The occupation of such implements is gone in the Yester deep land culture. The subsoil trench-ploughing, by the double operation, effectually and permanently pulverizes not only the soil, but the subsoil, to the depth of 19 or 20 inches; and the Tweeddale plough itself afterwards maintains the soil in a state of pulverization to the depth of 15 inches, having still a stirred subsoil of 4 or 5 inches beneath a really unusually deep furrow. Experience has fully established that from the pulverized state of the soil in spring, no other implements are wanting for the cultivation of the soil than the plough described above, together with the common harrow with long tines." This is sufficiently suggestive. There can be no doubt that the Yester system is a great fact, and has resulted in an established success; moreover the result of the closest investigation into its peculiarities can discover nothing which prevents its adoption in other districts. Indeed, the facts established by it afford the strongest argument in favour of the plough—when philosophically used—as being in reality the best and cheapest implement which can be used for the cultivation of the land. Nothing, in our opinion, would tend so forcibly to lead away many minds from attempts to supersede the plough, as the wide adoption of the Yester, or some similar system, which seems to afford the best work of which the plough is capable; and gives the deeply-pulverized seed-bed with inverted furrow, so strenuously insisted upon by all thinking agriculturists who advocate its use. We are glad to see that attention to this system is becoming widely spread. It certainly does not seem to follow—at least there is no reason to conclude—that these clods and hard nodules of soil should be an invariable concomitant of some, if not the majority, of cultivated soils. One prolific cause, in heavy clay soils, of these clods, is the stirring of the soil while in a wet state. Now in the Yester deep land culture there is a complete cessation of ploughing "from the autumn cross ploughing of the stubble, to the making up of the land for turnips in spring." The soil remaining in a pulverized state, the farmer is in a measure independent of the weather both in winter and spring, "as the land can wait for the best weather." There seems then a probability that good thorough cultivation will put and *maintain* the land in such a state, that many implements which are now considered—and are indeed—essential, may be entirely disused. There is no doubt also that the power of steam applied to the working of cultural implements will tend greatly to prevent the formation of clods and a hardened surface, by doing away with the poaching and puddling of the horses' feet. An eminent man once remarked to us, that in view of the simple elementary implements, the plough and the harrow, which were for so long a period considered the only ones essential to secure good cultivation, the long array of complicated machines to be seen at our great agricultural shows was really very puzzling, and was calculated to make one wonder whether they were really all required or not. It will be odd indeed if experience in cultivation brings us back again to the use of these two implements only, the plough and the harrow; the experience of the Yester system points at all events to this result. There is such a thing as a *variety* of machines being necessitated solely by the badness of a system of procedure.

Broadcast and drill-sowing are now known as respectively the "old and the new" school of procedure. There is something thoroughly sound and satisfactory in the principle of a corn drill; and something as sound in the mechanism by which it is carried out. The "swing lever" was just the thing wanted to take the machine out of the category of doubtful, and place it in that of accomplished pieces of mechanism. But the "drill," looked upon by many as the ultimatum of sowing machinery, beyond which no progress can be made, is perhaps destined to be rivalled by another machine acting on a different principle. A rising class are now advocating the "dibbling" system as productive of infinitely higher results than even the drill; that it is, in fact, as much above this machine in efficiency as the drill is above the broadcast system. If these opinions with reference to the value of the dibbling system gain ground—and there is apparently too much soundness in the principle to allow of its dying away, without gaining a wider trial than it has yet met with—a wide field in which to exercise their ingenuity will be opened up to our mechanicians. The problem to be solved, in the perfecting of a dibbling machine capable of a higher rate of working and economy than has yet been effected, is, however, a much more difficult one than may at first sight be imagined. Unfailing deposit of the seed, uniformity of depth in its deposition, and undeviating regularity of operation, must all be attended to. The weight of evidence is apparently in favour of the deposition of several grains in the hole rather than in that of one or a "single" grain only.

It is obvious that steam-power, if brought into requisition for cultivating the soil, will be made to aid in succeeding operations—in our sowing, and in our harvesting. In view of this extended application of the new power, considerable modifications will be necessitated in the management of our "drills." To obtain the full economy and efficiency of steam, its operation must be as continuous as possible: once set in motion, the machine which it operates must or should go on until its work is performed: all stoppage to arrange or modify its mechanism is just so much loss, and must therefore be avoided. Hence with steam-drawn drills a higher class of workmanship, with mechanism calculated to make the machine meet its own wants with as little human interference as possible, will inevitably be required. We fear that the attempt to apply the present machines — admirably adapted as they may seem, and indeed are, to our present system—to steam-power will only result in disappointment, with loss of time and money. As we have before said, the new power will necessitate the use of new implements and machines; not necessarily new in the principle of their operation, but new in mechanical arrangements, suited to the vastly different circumstances under which the processes they are designed to serve, will be carried when the new power is predominant.

The same remark applies to hay-making machines and reaping-machines.

While examining with a pardonable wonder the curiously complicated, but withal most efficient machines used in the various branches of our manufactures, as the cotton, the wool, or the silk, we are apt to think it strange that the same facility of mechanical adaptation has not been observable in agricultural machinery. But, while far from ignoring the fact that comparatively little has been where much might have been done, we should remember that the difficulties surrounding all attempts to adapt finely constituted mechanism to agricultural operations are much greater, indeed generally of a totally different kind, than those which surround similar attempts in manufacturing mechanism. On this point, we venture to quote a few remarks given elsewhere:—"In many of the processes of our manufacturers, however much we may be astonished at the precision with which operations are carried on by the aid of machinery alone —operations which seem to demand some share in the human will—the obstacles which presented themselves in adapting mechanism to carry on these have been of a nature comparatively easy to be overcome. The nature of the material to be operated upon is generally unvarying; or at least, where changes do occur, they are of such a nature that simple mechanical arrangements obviate all inconveniences resulting therefrom. Not so, however, with reaping-machines. The material to be operated upon is continually changing; and the difference between a rainy day and a dry one—between hilly ground and level—between laid grain and standing—is just all the difference that is required to make the material either that which affords facilities to these machines in cutting, or, on the other hand, of throwing such obstacles in their way as to render it almost an impossibility to cut it at all. But the capability of *merely* cutting corn under all circumstances of time, place, and condition, is not the only work which a reaping-machine has to perform. The gathering-in and distributing of the corn after being cut, ready for the binders, is an equally important part of its duties. Nor, in fact, does its mission end here: a perfect reaping-machine should be capable not only of cutting the corn with undeviating regularity, but of arranging it into bundles of defined and unvarying size; leaving, as the only labour to be performed by the hand, the tying of these bundles, and the placing of them in the field in the form of 'stooks.' Performing this wider range of duties, the machine is better distinguished by the American term of 'Harvester.' As in machine-spinning, so in machine-reaping, the less there is for human hands to do, the more perfect the machine. But herein lies the difficulty of effecting machine-reaping: as we have shown, the material on which, and the circumstances under which it operates, are varying in character, and do not present that uniformity which opens up much hope that with our present system of culture, we shall be able to rival the automaton performance of our manufacturing mechanism."

In this department of agricultural mechanics the implement-maker must be aided by the farmer, and exactly in the way we have indicated when treating of the application of steam-power to culture. If the preparation of the land previous to the operation of the cultural-machine is, as we have endeavoured to show, essential to the full perfecting o the steam-working system, it is no less essential we conceive to the perfect working, or at least greatly increased efficiency, of the reaping-machine. And here comes, in full force, the opinion of the gifted mechanician whose words we quoted at the conclusion of a recent article, and to which we again refer the reader. If, then, the agricultural mechanic can obtain fields calculated to aid the operation of his machine, rather than to retard it and throw difficulties in the way of its performance—as too many fields do now; if, moreover, by the more extensive adoption of that system of sowing which, as its advocates say, gives us thick strong straw, little liable to be laid by winds and rain, there can be little doubt that our reaping-machines will soon be brought to that state of mechanical perfection which will enable them to carry out those complete operations that will be demanded of them should the power of steam ever be adapted to their working. What these complete operations are we have endeavoured to show.

SIZE OF FARMS IN AMERICA.—In the wheat region, south of Lake Ontaria, the farms are usually from 150 to 200 acres in extent, though many are much larger. The farmhouses are roomy and comfortable, impressing one favourably with the condition of the occupants. The female members of the family have ample employment in the cleaning and cooking departments, and the table at the different meals is loaded with a profusion of dishes. House servants are dispensed with as far as possible. Butcher-meat appears at breakfast, dinner, and supper. The Americans no doubt eat a vast deal too much of such stimulating food. Indeed, I do not think that any class in England consumes so much butcher-meat as all classes do here. It is a remarkable circumstance that farms have a tendency to decrease in size more rapidly where the land is poor than where it is rich.—*North America; its Agriculture and Climate. By Robert Russell.*

INQUIRY RESPECTING THE QUANTITY OF NITRATES CONTAINED IN THE SOIL AND IN THE WATERS.

[TRANSLATED FROM THE FRENCH OF THE "JOURNAL D'AGRICULTURE PRATIQUE."]

In a former paper I endeavoured to demonstrate that saltpetre acts directly upon the development of plants. I mentioned the experiments made upon the employment of nitrate of soda of Peru in extensive farming, and called to mind that nitrates had been detected, for a great length of time, in arable lands possessed of a high degree of fertility, by Bowles, Praust, and Einhoff, in the waters of brooks, rivers, and springs; in meteoric waters by Bergmann and Berzelius; and, more recently, by the remarkable labours of Messrs. Bineau, Henri St. Claire Deville, Brandes, Liebig, Bence Jones, and Barral.

In the researches I have had the honour to lay before the Academy, I proposed to myself to extend the investigations of my predecessors, by determining what, at a given moment, is the quantity of nitrates contained in a hectare of arable land, a hectare of meadow, a hectare of forest land, and a cubic metre of river and of spring-water.

The nitrates have been found in forty samples of earth; but, before presenting the result of these discoveries, I must first make known the circumstance which has induced me to undertake the work.

I had had occasion to observe that the plants brought from the kitchen-garden of the ancient monastery of Liebfrauenberg contained considerable quantities of nitrates. Beet-roots, which I had cultivated in 1854 at the request of M. Peligot, contained also so large a proportion, that it became nearly impossible to extract the sugar from them.

Each year the kitchen-garden received in autumn a heavy manuring with rotten stable-dung. The soil is light, being a disintegration of the sandstone of the Vosges, and other motley kinds. The water is not retained in it, because the porosity of the earth descends to a considerable depth.

On the 9th of August, 1856, after fourteen days of drought, accompanied with great heat, we took some vegetable earth from a bed, and to one kilogramme of that earth, dried in the sun, we applied the equivalent of 0.211 grammes of nitrate of potash. The litre of dry earth, weighing 1.500 kilos., we have 516.05 grs. of nitrate to the cubic metre; so that on the 9th of August we might estimate the saltpetre contained in a hectare of the kitchen-garden at 1.055 kilos., taking 0.33 inch as the mean depth of the vegetable mould.

Such a proportion of nitrate, in a soil very heavily manured, has nothing surprising in it; in fact, to incorporate a soil well mellowed with stable-dung in an advanced state of decomposition, with either ashes or marl—to dig it thoroughly, so as to mix and let in the air to the whole mass —to form trenches to prevent stagnant water from accumulating, is, in fact, equivalent to manuring, and prepares a field to yield abundant harvests. Well, a little reflection will show us that this is exactly the process we adopt when we form an artificial nitre-bed. The only difference lies in that, in a moist climate, the nitre-bed ought to be sheltered, in order to preserve in the earths salts so soluble as nitrates; and that, however little continuous it may be, the rain does not fail to draw, or at least to penetrate into, the adjacent subsoil. Thus, from the 9th to the 29th of August, it rained every day at Liebfrauenberg, and they measured in the udometer 0.053 in. of water. The 29th of August, immediately after the rain had ceased, we collected earth in the same bed from which we had taken it on the 9th: after drying, 1 kilo. of this earth yielded 0.0087 grammes of nitrate; consequently, in 1 cubic metre, the equivalent of 0.13 kilos. of nitrate of potash, or 45 kilos. per hectare: the greatest part of the saltpetre had, therefore, disappeared from the surface of the earth.

In the month of September it rained fifteen times, and there fell 0.108 in. of water. On the 10th October, after fourteen days' drought, the soil of the kitchen-garden, under the influence of a continued wind, had lost its excess of moisture, and had become dry enough to' require watering. From earth taken from the foot of a wall breast-high, after having been dried, was obtained 0.298 grammes of nitre per kilo., or 447 grs. per cubic metre, or 1.490 kilos. per hectare, which rather surpasses that obtained by the dose on the 9th of August. The alternations of drought and moisture the soil had undergone, explain the enormous variations that we have noticed in the proportions of nitrates found in the soil. As to the great quantity of these salts, it proceeds, beyond a doubt, from the prodigality with which we manure, at all times, a kitchen-garden—the true type of intense culture. It is proper, therefore, to apply doses of saltpetre to soils which never receive manure, such as forest-lands, or which are only slightly manured, as lands tilled under a normal cultivation.

I have examined seven samples of forest-soil. The earth taken on the 27th October in a forest of pines near Ferreste, in the Upper Rhine, furnished no indications of nitrates.

The earth of a pine-forest, situated on the summit of a mountain of the Vosges, and in such a position as to be watered only by the rains, contained, on the 4th of September, the proportion of 7 grammes of nitrate of potash per cubic metre.

Sand taken on the 15th October, in the forest of Fontainebleau, contained per cubic metre the equivalent of 3.27 grammes of nitrate of potash.

In a heath soil collected on the 15th August, in the forest of Hatten (a short distance from the Rhine), we found the equivalent of 12 grammes of nitrate.

In meadow-lands, taken in September and October on the banks of the Saüer, in a valley of the Vosges, and a pasturage situated near Roedersdorf (Upper Rhine), the proportion of nitrate of potash has varied from 1 to 11 grammes per cubic metre of earth.

Of nineteen samples of arable earths, of good quality, taken in September and October in the valleys of the Rhine, the Loire, the Marne, and the Seine, four yielded no nitre. The lands which contained the least were taken from a field of maize at Hoerdt (Lower Rhine), from the vineyard of Liebfrauenberg, and from a field of beetroots on the banks of the Saüer. The cubic metre of earth did not contain, respectively, more than 0.8 grammes, 1.28 grs., and 1.35 grs. in equivalent of nitrate of potash.

I had not waited for this last result, in seeking nitrates in the calcareous *amendements* which are applied to the soil in large dressings. The shell-marl formed, as we are aware, of the debris of cockles, had become incorporated with the earth we are about to speak of, in consequence of an application of 70 cubic metres per hectare. In 1 kilogramme of this shell-marl, recently taken from the pit, I was not able to detect the least trace of nitrate.

A very white marl, from La Chaise, near Louzouer (Loiret), examined immediately after its extraction, contained the proportion of 7.2 grs. of nitrate of potash per cubic metre. In the marl of the same deposit, extracted in 1853, and which, since that time, had remained in a lump on the edge of the marl-pit, we obtained from the same volume 19 grammes of nitrate. A very argillaceous marl, from the hills of Chaumont, contained 25 grammes.

The chalk at Meudon is extracted from three overlying workings. The limestone taken from the upper stratum, in a cutting actively worked at a point where the quarriers were engaged, contained per cubic metre the equivalent of 16 grammes of nitrate. A fact worthy of observation is, that we have found no nitre in the inferior (lower) beds of chalk. When we know what is the mass of calcareous matter we incorporate with the soil in a dressing of marl, we can understand that, in spite of the weak proportion of nitrates they contain, they must be sought for, since they may form part of the substances which are held enclosed in the marls in only very minute quantities, but which at the same time are not less efficacious, such as phosphates of lime and alkaline carbonates.

With some exceptions, we have met with saltpetre in the earths examined in sufficiently weak proportions. But we ought not to forget that the experiments have been executed during a rainy autumn, and that the rain tends to take away, or at least to displace the nitrates. We have ascertained, in fact, that the nitre of a cubic metre of earth from a kitchen-garden has varied from 316 to 13 grammes, according as they were extracted before or after the occurrence of the rainy days. What is, above all, necessary to observe in the results obtained, is the fact of the frequency of saltpetre in vegetable earth, whether it belongs to the forest-soil, situated at such a height above valleys, that it receives as manure nothing else than the rain, or makes part of a tilled soil to which the most intense manuring is applied.

As water tends to dissolve the nitrates, we should expect to find a stronger proportion of these salts in a soil moderately manured, kept sheltered from the rain. I have, in point of fact, met with very remarkable quantities of saltpetre in the soil of hothouses, which has more than one analogy with artificial nitre-beds.

In one kilogramme of earth of a hotbed in the Jardin des Plantes, I found the proportion of 6 centigrammes of nitrate of potash, or 89 grammes per cubic metre. A kilogramme of earth, taken from another hotbed in the same establishment, has yielded the equivalent of 6 decigrammes of nitrate of potash, or 804 grammes per cubic metre.*

Our learned contemporary, M. Moquin Tandon, having readily authorized me to take from the hothouse of the botanic garden of the College of Medicine the samples which I required, I have been enabled to detect, in 1 kilogramme of the light black mould from the surface of the frame, the equivalent of 0.121 grammes of nitrate of potash, or 161 grammes per cubic metre.

In one kilogramme of strong earth, taken at the depth of 30 centimetres below the light mould, we obtained the equivalent of 0.107 grammes of nitrate of potash, or 185 grammes per cubic metre. It will not, perhaps, be useless to observe here, that it is precisely in this same hothouse of the College of Medicine that M. de Luca has made his interesting experiments upon the nitrification of potash by the elements of the atmosphere.

Whether the nitrates, of which I have given the large dose in the soil of hothouses, have their origin in the atmosphere, or that they may be formed as the result of modifications which the organic matters in manure gradually undergo, in presence of alkaline or earthy bases; or, still further, that they result simply from the successive accumulations of nitrates brought by the water employed in watering it; or, lastly, from these various causes united; it is still clear that their continuance in the earth depends essentially on this circumstance, that the pluvial waters do not carry them away. Setting aside also the favourable influence of the temperature of humidity, everything leads us to believe, that it is in a hothouse that a manure produces its maximum of beneficial effect. On this subject I may be permitted to offer some reflections.

In the actual state of our knowledge it is natural to attribute the azoteous principles of vegetables whether in the form of ammonia or of nitric acids, regard being had to the question of ascertaining if the azote of the acid does not pass into the state of ammoniac under the influence of vegetable organism. The azote of albumen, of casein, and of fibrine of plants, has very probably formed part of a sal ammoniac or a nitrate. Perhaps we might add to these two salts a brown matter which we obtain from manure. But even with the adjunction of this matter, still so imperfectly known, it remains an established fact that every immediately active element of a manure is soluble, and, consequently, that a manured soil, when exposed to continued rain, loses a portion more or less strong, of the fertilizing agents which have been given to it; besides, we constantly find in drainage waters the true lixiviate of the land—nitrates and sal-ammoniacs. And if it be true that the summits of mountains and elevated table-lands have no other manure than the mineral substances derived from the rocks from which they are found, and the meteoric waters, it is not less so that in the most ordinary conditions of cultivation, a soil strongly ameliorated yields to the pluvial waters which pass through it more fertilizing principles than it receives from it. In giving to the soil a coat of manure in a slightly advanced stage of decomposition, containing by that means, rather the elements of ammoniacal products and nitrates, than of those salts themselves, the inconvenience resulting from the action of protracted rains, is less than if they gave it rotten dung, in which the soluble salts already predominate. Besides, amongst the incontestable advantages arising from the application of liquid manures, I think we ought to place in the first rank, that of bringing to the plants cultivated, only matters properly modified to be absorbable, offering them to the plants only in proportion to their wants; the true dressing bearing a certain resemblance to the most delicate proceedings of experimental physiology, and which preserves the manure from the dissolvent action of the rain waters.

If the meteoric-waters over which the agriculturist has no command, produce often an effect unfavourable to his cultivation, by their abundance and, above all, their unseasonable intervention, it is not thus with spring and river waters, brought by irrigation; or those which are held by absorption in a valley in a suitable state of moisture. These waters, when we measure them to the soil, yield to it the entire of the useful substances they hold in solution or in suspension; calcareous and alkaline salts, carbonic acid, organic matters, &c., and in order to show in what large proportion these dissolved or attracted substances are introduced, I shall recapitulate that in a series of experiments which I had undertaken in order to determine the volume of water necessary to irrigation in our climate during summer, I was able easily to produce an absorption per hectare on land strongly seeded with trefoil, ninety-seven cubic metres of water every twenty-four hours. This was, after all, not more than a watering to the extent of 9.07t. of liquid per square metre. It was casting upon the soil a covering of water of less than 0.01 in. thickness.

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* These earths had not the same density; but I report from memory the weight of the litre of each earth examined.

Amongst the salts useful to vegetation conveyed by irrigation to the soil, we ought to distinguish the nitrates, the fertilizing effects of which had not escaped the sagacity of M. Henri Sainte-Claire Deville in the classic work he has published on the composition of potable waters, and from which he has deduced as a consequence, that the waters of springs and rivers are for meadows a powerful manure by the silica and alkalies they bring and by the organic substances and *nitrates*, in which the plants find the azote indispensable to their organization.*

It is not necessary to insist upon the interest that might be attached in detecting in the waters so active a manure as saltpetre; the results at which I have arrived, by showing to what an extent the proportion of that element varies, justify besides the opportunity of executing similar researches.

Thus I have scarcely been able to ascertain the nitrates in those enormous masses of water contained in the mountain lakes of the Vosges.

The water of the Seven Lake with the same valley, a little below Lake Stern, and from whence flows the Doller, has yielded per litre the equivalent of .07m. of nitrate of potash.

The pond at Soultzbach, near Woerth (Lower Rhine), formed by the dam of the little river of Soultzbach, is surrounded with mountains of sandstone of the Vosges. In a litre there was but .03m. of nitrate.

Spring Waters.—I have examined the waters of fourteen springs. The poorest in nitre were those of Liebfrauenberg, and of the ruins of Fleckenstein. Both proceed from the sandstone of the Vosges, and the litre contains from 0.03m. to 0.14m. of nitrate of potash.

The spring waters in which I have found the most saltpetre are those of the Ebersbronn (Lower Rhine), and of Roppurtzwiller (Upper Rhine), which yielded respectively 14 and 11 grammes of nitrate. These waters are used for irrigation.

Waters of Rivers.—Of the river waters analysed the least charged wiih saltpetre are those of the Seltz and the Saüer, tributaries of the Rhine, which respectively yielded 0.07m. to 0.08m. per cubic metre.

Those which contained the largest proportion of nitrate are the Veste in Champagne, and the Seine; the water of the former holding 12 grammes, and that of the Seine 9 grammes per cubic metre. This last result is deduced from six determinations made between the 29th of November, 1856, and the 18th of January, 1857. In 1846 M. H. Sainte-Claire Deville detected in the water of the Seine, in nitrate of soda and magnesia, the equivalent of 18 grammes of nitrate of potash per cubic metre.

At low water the Seine delivers at Paris per second 75 cubic metres, and during the average waters 250 cubic metres. In adopting 9 grammes for the nitrate, we find that at low water, in 24 hours, the stream carries to the sea the equivalent of 58,000 kilos. of nitrate of potash, and the medium waters 194,000 kilos.

If, now, we consider that the volume of waters of the Seine is far inferior to that of the generality of the large streams which furrow the different continents, we shall comprehend how immense is the mass of saltpetre continually borne away to the hydrographic basins; and with what incessant activity the phenomena which determine the nitrification must act on the surface of the globe.

Water of Wells.—I have generally found more nitrates in wells sunk in villages and rural workings than in springs and rivers; but here again the proportions have been most variable. For example, the water from the well of Bechelbronn, which indeed is not exempt from some traces of oil of petrolium, contains only indications of nitrates; whilst the water of the wells of Woerth and Freischwiller (Lower Rhine), sunk in the lias marl, exhibit from 66 to 94 grammes per cubic metre. But it is in the wells of the great cities that we find the largest quantities of nitrate. This fact has long since been known, and M. Henri Sainte-Claire Deville has found in water raised at Besançon the equivalent of 198 grammes of nitrate of potash per cubic metre. The proportion of nitre that I have met with, in the waters proceeding from 40 wells selected in the twelve arrondissements of Paris, is still larger. The experiments have been executed by two processes which I have employed comparatively—the decoloration of indigo, and the ingenious method we owe to M. Pelouze. The well waters in which there was the least nitrate came from the following places:—

	Nitrate of Potash.
Rue Guérin-Boisseau, in which we detected per cubic metre the equivalent of..............	200 gr.
Rue Saint Martin	225
Rue Sainte Georges	238
Rue des Petites-Ecuries........................	258

The waters which have yielded the most nitrate were those from the wells in the most ancient quarters. In the water of a well in

Rue du Fouarre, we found per cubic metre the equivalent of...............................	1,031 gr.
Rue du Foin Saint-Jacques....................	1,500
Rue Saint-Landry	2,093
Rue Traversine.................................	2,165

In two wells on the grounds of market gardeners in the Faubourgs, the cubic metre of water contained 1.268 k. and 1.546 k. of nitrate. It is thus seen that 100 cubic metres of these waters, exclusively destined for watering the grounds, convey to them from 120 to 125 kilos. of saltpetre, the utility of which as a fertilizer cannot be disputed, especially when we know that in summer a hectare of market-garden ground absorbs from 30 to 40 cubic metres of water per day.

The large proportion of nitrate found in the water of the wells of the capital is undoubtedly due to the modifications to which the organic matters with which the soil is constantly impregnated are subject. The purity of the air and the water, the effects of which manifest themselves so powerfully upon the public health, must be deeply affected with it. I have shown at another period that the rain, after having swept, in crossing, the atmosphere of a large city, holds in solution or in suspension much more ammoniacal and putrescent organic principles than when it falls at a distance in the country. To-day I have shown that the water of wells, after being filtered through a soil similar to a nitre-bed, is tainted with substances evidently injurious. So true is it that a condensed population carries in itself the germs of insalubrity.

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* *Annales de Chimie et de physique*, 3rd Series, v. 23, p. 52. The following is the summary of the labours of M. Sainte-Claire Deville. "These analyses establish, 1st. The importance of the portion of silica in potable waters, which M. Payen had previously found in great quantity in the water of the wells of Grenelle. 2nd. The part which this agent, in connexion with the azoteous matters of the waters, takes in the fertilisation of meadows. 3rd. The similar part which we ought to ascribe to nitrates in the action of water as manure, and consequently the importance of the nitrous elements in many cases. (1.) Water taken the 22nd October 1856. I mention the dates, because in the waters, as in the earths, the proportion of nitrates is not at all periods the same. (2.) Water taken the 25th October, 1856. (3.) Water taken the 24th August, 1856.

At Paris, by reason of the geological medium which it passes through, the water collected in the wells is not drinkable; nor is it drunk, or made use of in the preparation of food. According to that, we might suppose the population completely sheltered from the inconveniences which it would produce. This would be an error; for it is easy to prove that every inhabitant takes every day the whole of the substances dissolved in a certain volume of that water.

First, we are convinced that within the city walls the lixivium (*coupages*) of the heavy wines and alcoholic drinks are mixed with the water of the wells; and it is asserted that the bakers employ no other in making the bread.

One thousand kilogrammes of flour, in making into bread, require for the different leavens and dough 617 litres of water.

For produce they obtain 1,375 kilogrammes of bread, containing necessarily all the soluble substances of the 617 litres of water.

In 1 kilo. of bread there is therefore all that is found in 45 centilitres of well water. Let us next see which nitrates this water introduces.

The well water of the Hotel Scipion, the bakery of the hospitals, contains per litre the equivalent of 0.31 gr. of nitrate of potash; this is one of the waters least charged with salts.

One kilo. of bread prepared with this water should contain 0.1½ gr; and 1 kilo. made with the water of the well of Rue Saint Landry contains the equivalent of about 1 gramme of nitrate of potash.

In these weak proportions it is doubtful whether the nitrates are unhealthy; but what renders their presence in the bread unpleasant is, that it is the indication of organic matters, evidently proceeding from suspicious sources: from domestic waters for instance, or the infiltrations that escape from the 60,000 privies sunk below the soil. We must not forget, also, that every year, by the rising of the Seine, the subterranean inundations put in communication the inferior with the upper strata of the soil, in the latter of which are the receptacles of the night-soil, &c., and that the waters in washing the soil convey, in what they draw, spores of cryptogamic vegetation—those mouldinesses always hurtful, and so much more to be dreaded that their organism, apparently so frail, resists nevertheless the temperature of the oven in baking bread, as laid down by M. Payen, and more recently by M. Pagiale.

In a memoir read before the Academy in 1852, I have already spoken of the disgust inspired by the well water when we know, and no one is now ignorant of it, that they are employed in the bakeries. Already, if I am well informed, the administration of the hospitals have made arrangements for procuring the water of the Seine to the bakehouse of Scipion. This is undoubtedly an example that will be imitated; for we cannot comprehend why, at Paris, they should persist in preparing bread with impure water.

From the whole of these investigations we may justly conclude that with regard to the fertilizing principles they bring to the earth by irrigation or absorption, the waters which circulate on the surface, or at a slight depth, act much more by the saltpetre than by the ammoniacs which are found in them. In my paper on the ammoniacs of the waters I have shown that river water rarely holds above 0.2 gr. and spring water 0.02 of alkali per cubic metre; now the results hitherto obtained indicate in a cubic metre of the same waters the equivalent of 6 to 7 gr. of nitrate of potash, answering, as azoteous manure, to 1.10 gr. of ammoniac. These numbers are very nearly the same as those deduced by M. Bineau from his chemical studies on the waters of the basin of the Rhône.

The geological constitution of a country has likewise the most decided influence on the proportion of saltpetre. This influence, which is stated by M. Bineau, is above all revealed in the course of this work. Thus, in the lakes hollowed in syenite the waters exhibited only traces scarcely appreciable of nitre; those which proceed from the red or quartzose sandstone of the Vosges appear not to have more than 0.5 gr. per cubic metre; whilst in the calcareous lands, as they belong to the trias, to the jurassique country, to the cretaceous group, or to the tertiary deposits above the chalk, the spring and river waters have furnished the equivalent of 15 gr. per cubic metre of nitrate of potash, and the proportion has varied from 6 to 62 grammes.

If in the springs and rivers there is generally more of nitrates than of ammonia, the contrary seems to exist in rain and snow water and dew.

From experiments continued for six months in 1852, we established that meteoric water, collected from a great distance from inhabited places, contain on an average 0.74 mgr. of ammonia per litre. Since then Messrs. Lawes and Gilbert have found a number nearly similar, by observations during a whole year, at Rothamstead.

In the summer and autumn of 1856 I have examined ninety samples of rain collected at Liebfrauenberg. In seventy-two of those waters it was possible to detect the nitrates, which agrees with what M. Barral has stated; and the quantitative results to which I have arrived, although leaving perhaps something to wish for, nevertheless authorise me in believing that rain, when it falls in the middle of fields in the proximity of extensive forests, contains much less nitric acid than ammonia.

BOUSSINGAULT,

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THE ADVANTAGES OF A DAILY REGISTER OF THE RAIN-FALL THROUGHOUT THE UNITED KINGDOM, AND THE BEST MEANS OF OBTAINING IT.

That the advantages of an accurate register of the rain-fall would be abstactedly useful, no one would for a moment dispute. We would even say that for certain practical purposes—such, for instance, the use of water-courses as a motive-power, the regulation of flood-gates in flat districts exposed to inundations, or even for the purposes of irrigating and warping—such an accurate register as Mr. Denton advocates is indispensable, if certain success be aimed at, and nothing left to hazardous and reckless speculation; but we certainly differ from him, when he attempts to attach to this accurate and universal register a necessary action and influence over the drainage of land.

It is evident that drains are not meant for a constant and never-ceasing action. Their use is to discharge water when there is an excess of water to discharge. Where much rain falls upon the surface they underlie, their action is more frequent than in districts where a less quantity of water falls from above; but on account of that more frequent use, provided the outlet they offer to the supply of water be sufficient, no one would think of laying them at closer intervals or at greater depths than in soils of a similar nature, but situated in less rainy districts. The nature of the soil itself—the more or less retentive texture of its constituents—the topographical position and plane of the surface, are the objects of much more immediate and indispensable considerations for the regulation of depth and intervals than the quantity of rain that may generally fall during a whole year. A rain gauge, even assuming that the instruments now used are accurate—and Mr. Denton tells us that upon this important point there is a conflict of opinions—can only give us the quantity of rain that directly and perpendicularly falls over a plane area; but it does not register the quantity of water which, in addition to that direct fall, flows over underlying lands from neighbouring hills, or surface undulations, and other causes, in which case, the register of the rain-gauge is of no earthly use. Again: it often happens, even in those districts where the rainfall is the least, that at any moment showers, such as frequently accompany thunder-storms, will rush upon the land, and in a few moments pour upon its surface a large quantity of water, which of course the drains must be capable of discharging.

It is very obvious that in wet climates the drains are brought into more constant use than in drier ones. But we contend that this is the only difference, and that difference can hardly be practically taken into account in the laying of drains; for however small the yearly average fall of rain may be, the drains may be called upon to discharge at any given moment quite as large a quantity of water, although less frequently, as in lands situated in more rainy districts. We cannot, therefore, understand what practical use in drainage the accurate register of rainfall can be; for the only local circumstances we know of, that must regulate the depth and intervals between the drains, is, as we have said: the nature of the soil itself, and the topographical position of the land in respect to the supply of surface water that may flow from adjacent rising grounds, to a much larger amount than that given by the rain-gauge, and of which that instrument cannot give the most fractional idea. Besides, whatever the fall of rain may be, or, in other words, however often the drains may be called upon to act, this cannot interfere with the intervals and the depths at which the drains should be placed; for the extent of those intervals is exclusively determined by the nature of the soil, and should be limited only by the point where the action of the drains ceases to act laterally—the limit of the action of one line of drains ending where the action of the next line begins.

The phenomena exhibited by the movement of liquids are ever the same. If a shower falls over the great desert of Sahara, where rain is seldom seen, its descent downwards through the soil, sandy though it be, is regulated by the same opposite forces of gravitation and capillary attraction as when falling in countries where rain falls more frequently. It is true drains would be more useful in one case than in the other; but surely an accurate register, such as Mr. Denton advocates, is not necessary for ascertaining that plain fact, the experience of the most ignorant *old inhabitant* of a district being amply sufficient. In all cases where thorough drainage is aimed at, drains must be laid under every variety of circumstances, at such a depth and at such intervals that the limit of the action of one line terminates where that of the other begins, whether that action is to be exercised only one day in the year, or two hundred days.

When we say that there are districts with a rainfall of 50 inches, and others with only 25, we do not mean that every shower falls with twice the intensity upon the one as upon the other: we only mean that rain falls twice as often, or, in other terms, that the drains are called upon to act twice as often in one case as in the other; but to all intents and purposes the quantity of water which they must evacuate in a given time is pretty much the same.

Then, there are other circumstances which have a direct influence upon drainage, which the rain-gauge cannot reach; and these circumstances, as regards that influence go far to compensate the difference of rainfall between the western and the eastern districts of this country—we mean the fall of snow. It is a well-known fact that snow is a rare occurrence in Cornwall and Devonshire, whereas it accumulates sometimes to a great depth in the eastern counties. When that mass of snow comes to thaw, with all its accumulations against every obstacle, what becomes of the land, in the spring of the year, when a high temperature and dryness of soil are necessary for the purposes of vegetation, if, on account of the register of the rain-gauge, a deviation from the general rules of drainage had been ventured upon? It strikes us that no rain-gauge has yet been constructed so as to give anything like an accurate datum of the quantity of water brought down in a fall of snow, drifted as it generally is by a high wind.

As regards the means of effecting the general register of rainfall in this country, at a cost of some £26,000, as advocated by Mr. Denton, we are pretty confident that no Chancellor of the Exchequer will ever be found to debit his budget with such an item as this, even if it were admissible that sufficiently diligent and careful individuals could be found to undertake such a task for the remuneration of five pounds per annum!

Apart from this anxiety of Mr. Bailey Denton to prove too much, and to overstretch the importance of the measure he advocates, his paper is replete with instructive facts, and shows a great accuracy of observation, and wonderful ingenuity in arranging the results of his experience. His tabular records of the Hinxworth drainage are certainly the best arranged we have ever seen.

THE CLEANING OF CORN FROM THE STRAW.

Knocking, scutching, or rubbing out grain from the straw, is an operation in which comparatively little improvement is required. With a thousand or twelve hundred revolutions per minute almost any "drum" will now beat or strip out every grain from sheaves properly opened and "fed" to it. Much ingenuity having been applied to the shaping of new "beaters" (some of them, indeed, being no improvement upon the old square ones), and to the contrivance of a better "screen, or concave," we have now patent beaters, of different sorts, that may be said to perfectly extract corn from the ears without splitting or breaking it. They are adapted to damp, as well as dry stuff; and also save power, by being of a more or less wedge form, and so cleaving their way through the air, instead of driving it like a fan. At the Gloucester Meeting in 1853, and at Lincoln in 1854, about two-thirds of the combined-machines thrashed clean, or nearly so; and about the same number did their work without breaking the grain. At Carlisle, in 1855, all the machines thrashed perfectly clean: two-thirds completely avoided splitting; and two other machines, out of the nine tested, were nearly as meritorious in this point.

As regards the state of the straw, at Gloucester two-thirds, and at Lincoln not half the machines, delivered the straw whole; and at Carlisle only two machines were considered perfect in this respect; while four others out of the nine nearly equalled them. But breaking the straw is a fault or an advantage, according to the purpose for which the straw is intended; and in districts where it cannot be sold, and is consumed as fodder or litter for cattle (and unless it is being thrashed for thatching), farmers prefer to have it well broken. Altogether, the performance of the strictly thrashing part of the machines left little to be desired in regard to the quality of the work; and in two years and a-half since that time, various improvements have been introduced. The time and power requisite for thrashing a given quantity of corn varied very much in different machines; and no doubt we shall find a great advance in these particulars, when the dynamometer is applied, between the engines and machines next July.

The processes of extracting the grain free from straws, ears, or chaff, delivering the clean straw by itself, and separating the chaff and pulse, colder or cavings, are not yet conducted in the most desirable manner. At Gloucester half the machines were thought to shake the straw perfectly clean, and one nearly so; at Lincoln three machines performed clean shaking, and seven more out of fourteen nearly equalled them; but at Carlisle there were only two out of nine machines which carried absolutely no grain over with their shakers, four others being only slightly defective; while there was plenty of room for improvement in the rest. So far good, as respects the two "perfect" shakers; but a quarter of an hour or twenty minutes' time of working is not long enough to detect the liability of the slats, screens, bars, or meshes of the shakers to collect choking straws, and gradually impede the passage of corn through them; for what are at first considered good shakers will sometimes be found to foul themselves in hour after hour of jumping underneath such stuff as straw and broken cavings of all imaginable lengths, bent in all possible forms, tossed in all postures, and traversing across the area of the shakers in every sort of direction. Freedom from liability to choke is a particular, however, in which many advances have lately been made. Another important consideration is, that this continuous clean-shaking shall be effected by simple mechanism, avoiding as far as possible all shock and unsteadiness to the machine framing, and excessive wear of brasses or working parts. Now, as the effectiveness of the process of shaking depends upon the most complete and repeated *tossing or striking*, as well as *thinly distributing*, or drawing out the bulk of straw, so that it may give the enclosed corn and chaff every chance of dropping out, some of the most thorough shakers are objectionable in their motion; while, on the other hand, some of the smoothest and easiest running imperfectly perform their work. How smooth and beautiful is the action of the rotary shaker, which dances the straw over a succession of revolving rollers armed with curved rakes or teeth! Yet, simple as are the means by which motion is communicated to these rollers, how many parts and small bearings there are! and the effectiveness of the work (at any rate at Carlisle) was far from perfect. But so important is the steadiness which it gives, the absence of shocks, and consequent smallness of wear and repairs, and freedom from gulling brasses and breaking shafts, that the principle is worthy of all attempts to increase the efficiency of its action on the straw. Box shakers appear to be the most general favourites with machine makers. The original parallel-motion spars thoroughly extracted the grain and chaff by their blows underneath the straw; but something more resembling a riddle or screen was required to prevent straws from dropping through lengthwise; and when boxes with wire meshes or perforated sheet-iron were found to catch and block up with straws, or else let them through, ingenuity devised slats of various forms to let through the corn, chaff, and pulse only. Then we had rocking-bars or slings at the outer end, thus relieving us from one of the crank-shafts, with all its wear and annoyances. However, if you diminish the tossing action of the boxes at one end, you must increase it at the other, either by greater speed or a further rise and fall, or else keep the straw longer upon the shakers in order to receive its due amount of blows. This latter plan is effected by prolonging the boxes beyond the vibrating bars; but in so holding back the straw, it is of course crowded closer together than if it had free passage over, and this principally at the point where it most of all needs opening, scattering, and dancing as lightly as possible—that is, just where the last few kernels are to be let fall out of the whole mass of straw. As a compromise between the parallel-motion, with crank-shaft at each end, and the vibrating at one end and rotating at the other, there is the plan of having half the boxes rock at one end and half rock at the other. Four boxes are the most common, but three have been tried, and we have seen two worked with admirable effect, though of course requiring a rapid speed. But the table shaker—that is, a screen all in one piece the whole breadth of the machine—is capable of turning out the best samples of long straw and cavings, as there are no apertures (as between boxes) where straws can get down, and nothing can pass except through the meshes. When constructed like a wire screen, however, straws will entangle and collect in it; and, if made with slats of wood or hoop-iron, the weight would become an obstacle to its jumping movement. The peculiar motion secured by the short slings on which it swings is precisely that well adapted for keeping the straw "lightened up" and loosely tossing, and as severely chucked and bounced at one end or one part of the shaker as it is at another. Now, cannot this be retained, and yet the shaker divided, so as to give a smooth and regular compensating movement, one half rising while the other is falling, and without additional slings (tiresome things) or additional complication? Suppose it made in two parts, not side by side, but one following the other, and each extending the same breadth as at present. Retain the present slings, one pair supporting the inner end of the first screen or table, and the other pair supporting the outer end of the second. Where the two shakers meet half-way, the first is to overlap the second, and both are to be hung upon cranks or eccentrics on a shaft placed across underneath, as for driving box-shakers. We should say that this arrangement would obviate the chief objections which the table shaker is now open to.

Separating corn from the chaff and cavings as they come from the thrashing machine must necessarily proceed on a different principle to the shaking of the straw in order to extract these products. Pulse, calder, cavings, chaffings, or whatever you call the short bits of straw and empty ears, can be divided from the grain and chaff by screening, sifting, or straining away the latter through a riddle; but as pieces of straw can penetrate endwise through an aperture large enough to pass chaff and corn, the aim must be to keep them horizontal, and avoid any tossing motion that might turn up ears or straw into an inclined or upright position above the holes or meshes. The holes in a shaker may be small, yet the straws dropped through are many inches in length. In riddling, all these straws must be prevented passing through holes large enough for the corn; and this can be done only by causing them to travel across the screen without jumping and falling upon it as they do in a shaker. Revolving riddles, desirable as their even regular motion may be, cannot answer, unless, by means unseen at present, they are made to avoid the rolling and tumbling of the pulse upon the meshes or slat apertures; and contrivances for drawing or pushing the stuff across fixture riddles are also completely objectionable, from their heaping and gathering of the corn within lumps of the cavings, instead of thinning all out as much as possible, in order to facilitate the escape of grains and chaff. We cannot imagine anything for the purpose better than the horizontal jogging motion given to our present riddles, the riddle itself being slightly sloped so as to give every particle of stuff upon it a tendency to travel in one direction over its surface. If all the bits of straw, &c., were of one length, and all traversed the riddle in the same posture, lying either lengthwise or crosswise, it would be easy to shape slats or other divisions of the riddle into apertures that would be bridged and slipped over by the straws while admitting the corn and chaff to pass through. But the difficulty is, that the stuff lies in all directions, and is of innumerable sizes. The aim must therefore be to form the apertures of a shape—say round, square, or but slightly varying from these figures—so as to present equal impediments to the entrance of the straws or ears in every direction. A wire screen with square or hexagonal meshes, or sheet metal perforated, might answer the purpose very well for a short time—that is until it became clogged with caught and doubled straws—provided that no straws dipped and poked their ends beneath the wires, and so became gradually jogged underneath (that is, through) the riddle, instead of being conveyed over the top. Hence it is indispensable that sloping walls or partitions should be given to the apertures, at any rate on that side opposite to and meeting with the advance of the stuff, in order to hinder the passage of straws in a downward direction, and by their inclined surface raise up any dipping-ends on to the riddle again. This is a most important point in the riddling apparatus; and we advise purchasers of combined thrashing machines to be very particular in their choice; for when the riddles have any tendency to clog and block up, and continual attention is needful in clearing them, not only time is lost in frequent stoppages, but waste of corn is inevitable. Now, for passing off the straws endwise without any poking through, and at the same time for presenting apertures that no mass of chaff and corn can by any possibility choke up, we have the slat riddle, resembling a Venetian or louvre shutter, with the slats inclined say at 45 degrees. This form was originally intended also for having a blast underneath, which blowing up through the spaces, and meeting the corn and chaff, should separate the latter, as well as tend to lift and throw off the pulse above. But we do not approve of this principle, preferring (as we shall hereafter show) to separate the pulse by simple straining or sifting, and reserve the whole force of the blast for chaffing in a different manner. To prevent straws from dropping through transversely, wires were introduced, passing through holes pierced in the slats. To gain more aperture space, and obtain the raising action of the inclined slats on the opposite side of the spaces, angle-bars, with their edge uppermost, have been adopted; and another application of the principle of a sloping passage, or aperture, is seen in the riddle, made by boring round holes in a slab of hard wood, the holes slanting toward the blast, and widening downwards, so as not to choke. But, seeing that corn may possibly ride over this latter riddle upon the thick, though tortuous, interstices or partitions, although no pulse can penetrate through, and that straws may certainly drop between the angle-bars of the other riddle, or lodge across the wires between the slats of that first mentioned, our readers will be willing to receive our special approbation of a slat-riddle constructed as follows: The slats are to be of hard wood, half-inch stuff, before planed up, and say one and three-quarters inches deep; make them into a riddle, by letting their ends into a rectangular deal frame as wide as the machine will allow, and of sufficient length (to be noticed presently); the slats lying square across the frame, and inclined at an angle of about 45 degrees; the distance apart, measuring from middle to middle of the (parallel) slats, is to be one and a-half inches at the inner end of the riddle, and gradually less till it is one and a-quarter inches at the outer end. Thus far we have simply a slat-riddle, made slightly to vary in the size of aperture, according to the bulk of stuff upon it at different parts, this being of course much less toward the outer end, when most of the corn and chaff has been parted with, than it is when first entering upon the riddle. But now fix wires (rather fine), lengthwise of the riddle, *upon the top of the slats*, crossing them at right-angles, fastening each wire to every slat by small wire staples; the wires to be one and a-quarter inches apart. This improved form of riddle, contrived by a mechanically-gifted farmer in Cambridgeshire, and since adopted by some great manufacturers (in one case strips of cane being substituted for the rusting wires and their tiresome staples) works to perfection, or comes very closely to it, whether for wheat, barley, oats, or peas. It is just possible that improvement may yet be made in avoiding still further the wear, or liability to damage, of a riddle rather tedious and expensive to make, and rendering it utterly impossible for short ears to drop through or catch under the wires at the corners. At present there are a few refractory bits that will make their way through, and require to be arrested by the smaller chaffing riddle to which the corn, &c., is next conveyed. And we may say here, that no riddle must ever be expected to be absolutely perfect in its action, and that therefore we ought not to trust to a single riddle, but employ a second (of smaller dimensions and diminished apertures) to rectify the occasional omissions of the first, besides the extra facility we may thus get for chaffing. We have alluded to the length of the riddle. It is a common error to have them much too short, and adapted pretty well perhaps to a steady and regular supply of stuff. But the supply is often very irregular, partly owing to sudden thrusting in of whole sheaves at once by the man feeding, partly to the gathering together of lumps of stuff (especially when damp) either upon the riddle or on the way to it; and we ought to provide for such extreme and extravagant amounts of stuff at any instant, if we would prevent waste and produce a pure sample. The farmer above-named has his riddle 4½ feet long, and would like to stretch it another foot at least, to make it equal to every emergency. His chaffing riddle, which stops the escaped odd pieces of pulse, is about 2 feet in length, made with slats at similar intervals to the other, only the wires are ¾ inch instead of 1¼ apart. Instead of crowding the stuff upon a restricted surface, let the principle be to spread and open it out as much as possible, by causing it to pass quickly over the riddle, and hence a considerable length is necessary in order to give it due time for letting fall the chaff and corn. Another point to be borne in mind is, that corn may ride upon or within a knot or braid of doubled or intertwining straws, and so be carried over with the cavings; therefore it is well to make the riddle in two or more successive steps, say of 1½ or 2 inches fall each, to break the masses of stuff, and present fresh surfaces, as it were, to the action of the riddle. Of course there must be a part of the riddle free from holes immediately under the fall, in order to receive the stuff and transmit it in its newly-arranged posture by horizontal sliding (produced by the jogging of the riddle) to the apertures further on, as any falling or jumping upon the riddle is likely to pop pieces of the cavings through.

BEANS FOR HUNTERS.

As regards the propriety of giving hunters beans with their oats, I do not consider they should be given indiscriminately to all horses in any way; and, to such horses as may require them, most certainly not *with* the oats. Most horses are excessively fond of the taste of beans; and thus habituating them to get this addition to their oats is very apt to make them refuse a feed without them. The way I recommend beans being given is with three or four double handfulls of chaff, and that wetted so as to hold any small particles of the bruised beans—for some such will always be found. The chaff prevents greedy feeders from swallowing the beans without proper mastication, and, being given as a distinct feed, does not habituate the horse to their taste with his oats. I hold it a bad plan to accustom a young healthy horse (reasonably worked) to beans. They may be necessary when the stomach becomes weakened and inert from age or over-work; but strong stimulants to the stomach, unless taken medicinally, are bad for biped or quadruped. The strong healthy young man of twenty may like his bottle of wine a day; so may the five-year-old horse his beans; but if accustomed to them, what will the one want at the age of fifty and the other at twelve? Beans might be necessary to hunters when they were at cover-side at daybreak, and probably did not get home till the same hour they now usually do when hunts meet at half-past ten or eleven. In such days a fox was hunted to death; now he is raced into. Horses' were then absolutely wearied out with a day's hunting; now they are blown and exhausted for the time being, but usually recover themselves ere they reach their homes. Horses refusing to feed after hunting was much more frequent (as I have heard) in those days than it is now. A pedestrian, after a long fatiguing match of sixty miles, walking against time or a competitor, will feel all his energies prostrate; nor can we wonder if his stomach becomes so also; but the runner of five miles, though more blown and exhausted than the other when he stops, recovers in a quarter of an hour, and is quite ready in half a one for whatever you may put before him. The case is somewhat parallel as regards horses, unless their powers have been so overtaxed as to produce absolute illness. Post-horses, in former days, consumed a good many beans. Well might horses want them, who frequently were taken two, sometimes three, journeys a day, of twenty miles each. Coach-horses wanted them, that in former days were driven sixteen or seventeen mile stages over roads like a ploughed field. In my remembrance, the old Bath and Bristol Blue drove such stages. Horses undergoing such labour required beans, as the coal-porter requires porter. Beans formerly were in common use in training stables. Those were the days when the trainer had the majority of his string (five, six-year-olds, and aged horses) running heats, and those often four miles. Here direct lasting stamina was wanted, and the old platers required their old hearts kept warm by stimulants; but the case is altered now. If a trainer has a four-year-old in his stable, he is "the old horse," and all the remainder of his lot are juveniles. Except in the case of a particular colt, a trainer would never dream of giving a two-year-old beans. He would hold them as the forerunners of colic, flatulency, constipation, and eventually fever. In former days grooms kept the bowels of horses more or less in a constant state of constipation, and judged the hardness of what a horse voided as a proof of *condition*. Formerly, even with a hunter, when he found occasion for evacuation necessary, he stopped short if permitted to do so. It was an effort he could hardly make while walking; it was all but a painful act. And this was held *condition*. It was a state in which, if I saw a horse of mine, I should immediately resort to the bran-bin.

Horses going a *journey* is now a thing spoken of as one of the strange acts performed by our ancestors and their horses. It was then ten miles and stop; ten miles again, the stoppage repeated; ten miles and a long stop to lunch or dinner; and then another ten miles brought horses and travellers to their resting-place for the night. Horses subjected to the profuse sweats a heavy carriage and execrable roads produced, and then perhaps saturated with rain, required their insides kept warm. But in these days a man owning horses and carriages takes them with him by the railroad, as naturally as he takes his hat and gloves when he intends walking. Well, these peripatetic stables, coach-houses, and sitting-rooms are extremely convenient. Gentlemen and ladies have not the trouble of rousing themselves to look at the country as they speed through it, not being enabled, if they wished it, to see much more of it in their carriage than their horses in theirs.

Mais à nos moutons. Bruised oats have been brought before the public eye with the paramount recommendation of *saving*—in short, the vendors of oat-bruisers understand their business, and they understand the reigning feeling of the public. They would rarely sell a machine if their recommendation only went to show that bruised oats were better for the animal than whole ones; but they show their use is better for the man, by stating that instead of giving five feeds of whole oats, bruise them and you need give but four. Now, if they could prove that the horse cut off with four feeds could actually do more work than the one with five, this would be a saving with a vengeance, in two ways. Why, in that case we should not find a carpenter or wheelwright unemployed; they would be all making oat bruisers to satisfy public demand. But it fortunately, or unfortunately, happens that bruised oats cannot effect miracles; for I roundly assert that four quarterns of bruised oats will *not* produce the same nutriment as five given whole; that is, if the five are properly given. I conceive that the best oat-bruiser ever invented is the grinders of the horse. Some say, and indeed with truth, that greedy horses will swallow much of their corn whole; granted, but mix a few handfuls of chaff with the oats, he cannot then swallow the mixture without thoroughly and properly masticating the compound. Greedy feeders will swallow bruised oats without masticating them, as fast or faster than whole ones. I should not give them a chance of doing either, or rather the chaff would not; for I hold it just as judicious an adjunct to bruised oats as to others. I have heard people say, "A horse swallowing bruised oats does not signify; he gets the benefit of the meal." I should beg to observe, in reply to such opinion, that a horse has not the reputed stomach of the ostrich; he cannot digest his shoes, nor can he oats *merely bruised*. If ground to meal it would be a different affair; but an oat does not remain long enough in the stomach of the horse to as it were dissolve, unless first formed into meal by the grinders of the animal, and properly saturated with saliva. I consider bruised oats, on the whole, as good enough, if you prevent waste, and bruise them at home; for I hold a sack of oats sent out for this purpose does not always come home as immaculate as it went out. It is surely enough, if bruised oats convey more nourishment than whole ones; but do not cheat your horse in measure, and thereby cheat yourself, by fancying all people say of bruised oats as fact. Let me feed my horse as I like on five quarterns of whole oats, and you give yours four quarterns of bruised ones, and give them both similar work; I think I can prophesy which at the end of three months will be in the best condition, to a far greater certainty than any man can prophesy who will win the Derby, much more the Leger. —Harry Hieover, in *Field*.

WINFRITH FARMERS' CLUB.

INCIDENTAL DISCUSSION ON THE COMPARATIVE WEIGHT AND VALUE OF LARGE AND MODERATE-SIZED ROOTS.

The anniversary dinner of this Club was given on Wednesday evening, the 20th January, in the Black Bear Inn, at Wool, under the Presidency of Mr. J. A. Damen; Mr. T. H. Saunders occupied the vice-chair.

AWARD OF PRIZES.

The PRESIDENT had no doubt that the most interesting part of the evening's proceedings would consist in the Secretary's reading the award of prizes, which he, the President, had just broken open, as given under the hands and seals of the judges, Messrs. Henry Symonds and George Caines.

The SECRETARY accordingly read the awards. They were as follows:—

1. For the best ten acres of Swedes, the prize of £5, offered by J. B. Lawes, Esq., awarded to Mr. Charles Besant.
2. For the best root crop, upon one-sixth part of an acre of land, occupied by the competitor, the like prize of £5, offered by Messrs. Cardus and Dixon, awarded to Mr. J. Reader.
3. For the second-best ditto, ditto, ditto, awarded to Mr. T. H. Saunders.
4. For the best ten acres of turnips, the prize of £2, offered by Joseph Weld, Esq., of Lulworth, awarded to Mr. J. A. Damen.
5. For the best five acres of Swedes, another prize offered by Joseph Weld, Esq., awarded to Mr. J. Sly.[*]
6. For the best crop of *Mangel Wurzel.* No competition.
7. For the best five acres of ditto, prize awarded to Mr. J. Reader.
8. For the best acre of ditto, prize awarded to Mr. J. Sly.

These last-mentioned prizes were offered, we believe, by Mr. Robert Damen.

The Judges also highly commended Mr. Reader's Swedes, Mr. Clarke's Mangel Wurzel, Mr. Thomas Randall's Swedes, and Mr. Saunders' Mangel Wurzel.

The SECRETARY, in connection with these awards, read over the printed rules of competition adopted by the society, which appeared to have been acted upon by the judges, with exception of that part of them which required the prices and quantities of the manures used to be stated, but this it appeared had not lately been observed.

Mr. ROBERT DAMEN proposed the healths of the successful competitors, which he had much pleasure in doing, and, at the same time, in congratulating them on their success. Those who had not succeeded in this instance would, he hoped, not be dejected. That the rule requiring the manure which had been used to be stated had not been acted up to, he thought a pity, for it seemed to him that it would be interesting to know how those great and weighty roots which had gained the prize had been grown—a mere estimate might have been given of so interesting a fact (Hear, hear). He begged leave to propose "The Successful Competitors." All the honours.

HOW TO GROW HUGE ROOTS.

Mr. J. READER, in returning thanks, said that he had expected that Mr. C. Besant, who had gained the first prize, would have responded in the first place; but as the second prize was very nearly equal to the first (laughter, "They are both of the same amount"), he must say that he felt pleased at finding himself a successful competitor, when he had to meet such competitors as their friend the vice-chairman, who was almost the champion of Dorsetshire—for, having carried off Mr. Williams' prize some years ago, he might be considered as having become some years ago the Champion of the County; and he was in fact acknowledged to be as as good a farmer as any in the county. And not only was he there, but there was, moreover, another person who was present to compete with (a laugh), who, if he had not the deepest land, had as essential a thing; he had Mr. Weld's pocket to go to, and also those piggeries and feeding-stalls yielding that first-rate manure which was alike essential to good farming and essential to the growing of roots. He felt convinced he should never have grown the roots he had done, had he not manured them with first-rate farm-yard manure as well as with artificials. He had manured with the dung of fattened beasts, fed on corn and afterwards with artificials. In the first place, he had given from 30 to 40 tons of farm-yard manure per acre, and good too; and then, from a-half to three-quarters of a hundred weight of guano, and the same quantity of superphosphate. The greater part of his roots had been thus manured; but seven baulks had been manured with Messrs. Spooner and Bayley's mangel manure (applause), which he at first thought to be done at a dear rate, for he did not expect the same weight on those baulks, although quite the same quantity of manure had been used on them. In this expectation, however, he had been deceived. He had thought that the guano and superphosphate would have beaten —but it was not so. Where he had tried bones on these baulks he did not expect the same benefit from them as upon the hills; but when he got farther into the upper part of his farm he used a quarter of bones per acre; and, on the other hand, he had now tried guano and superphosphate mixed together, and had tried the mangel manure against it. He had forgot to tell them that he had used also of salt about 6 tons on 16 acres. So satisfied was he of the efficacy of salt as a manure for mangel, that he should continue to use it for years to come: he did not think that it benefited Swedes; but as for mangel he hoped to use it, as he had said, for years to come. [Mr. Robert Damen: "Have you weighed any part of your roots?"] He had not weighed the whole of his produce, but he had found that where the mangel manure had been used he had obtained 40 tons 2 cwt. per acre; where superphosphate, 45 tons 2 or 3 cwt. per acre; and on the upper part of the field 49 tons per acre. These facts he had ascertained by weighing in each instance a square rod, topped and tailed, clean.

COMPARATIVE VALUE OF LARGE AND MODERATE-SIZED ROOTS.

Mr. BONE, of Avon, said he attended there that evening as a matter almost of course, because he always attended the anniversary of the Winfrith Farmers' Club, and not being at that moment in the best of health, he ought rather to have excused himself, could he have done so with any sort of grace; but the knowledge that both Mr. Spooner and Mr. Blundell were suffering from severe illness, had weighed with him as an additional reason why the members of local farmers' clubs in the neighbourhood should attend there, in order to keep up the intercommunication which they had from time to time held with that club. Such were the reasons that had induced him more particularly to attend on that occasion. He was extremely well pleased to find the Club going on, doing good, and progressing. The utility of such clubs was beginning to be every year more and more discerned. Every year the necessity for discussion was coming to be felt more than before agriculture had taken up that prominent position it had done since former years. As agriculture ebbed and flowed, discussions ought to be taken over and over again; papers ought to be re-read and discussed anew, in order that they might revise and alter conclusions which they had come to on previous occasions. He need not illustrate this from any other matter in agriculture beyond root crops. They all found that the turnip crop was no longer to be depended upon; they also found mangel wurzel becoming of the greatest use in agriculture; and they also found that great stress was laid by agriculturists upon growing the largest possible roots. This he was inclined to think a great mistake. He had just read a very able paper by Dr. Wolf, the principal of an agricultural college in Germany, in which he stated that on their experimental farm, there had been a piece of newly broken-up land planted with the sugar beet, which was used for the purposes of distillation; and it had produced a magnificent crop of large, beautiful, and luxuriant roots; but after they had been grown they had been found to be quite useless, for the sugar manufacturers would not take them at all. Now, it was a well-known fact that sugar produced fat; yet it was not that principle in the feeding materials of roots, or any other thing, but nitrogen, that possessed the greatest feeding value. Well, as regards nitrogen, Dr. Voelcker had performed a recent experiment on fusty clover hay, and found that it showed more nitrogen when fusty than sweet hay did. No practical man would believe this; at least they all knew that sweet hay was better than fusty (a laugh); they were not all scientific men, but scientific men might meet with practical men at the clubs, and find that they had arrived at conclusions such as these. He trusted his friend Mr. Reader's large roots would not turn out the same as Dr. Wolf's; it would be a bad affair for him after the liberal allowance he had given them, and it was a question whether they ought not to keep to such an amount of roots per square acre as not to produce them of an over large size. They were aware that large roots did not possess that amount of nutrition that small roots did. Mangel wurzels of over 10 lbs. weight when cut open were generally found to be hollow and insipid. If that were the case it was impossible they could contain the same amount of nutrition. In conclusion he expressed himself pleased and proud to meet them all, and to see the Club flourishing, and he hoped that they would all again have the pleasure of meeting together and learning that the Club derived benefit from its intercommunication with others.

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[*] Mr. Sly has since favoured us with the following note:—"Manure used for Swedes per acre—2 loads of a mixture of pig-dung and ashes, 2 cwt. of Spooner and Bailey's superphosphate, and one-sack of half-inch bones. For mangel baulked—15 load (put) of mixed horse, cow, and pig dung, 2½ cwt. of salt, 2½ cwt. of Spooner and Bailey's mangel manure, sown by hand on the dung in the baulks before covering up; alongside of this used 2 cwt. of the best Peruvian guano per acre. When the roots were taken up we could not tell any difference, therefore I am now convinced that we can do much better without using any of the *costly* foreign stuff, until the price comes to be equal with our own *country's manufacture*, particularly if our landlords will only lend us a hand to erect sheds, not costly ones, to graze different sorts of stock in."

LANDLORD AND TENANT.

Mr. T. H. SAUNDERS, in responding to a call made upon him, expressed himself extremely obliged to his excellent friend Mr. Randall, and to the company. One thing Mr. Randall said with especial truth, and that was, that whenever an experiment had been made by him, he had always given the advantage of it to the club. He had told them in what he had failed, and he believed he had told them too in what he had succeeded. He had been happy and proud to belong to the club ever since it had been established in 1846, and he hoped that it might continue to flourish for many a year to come. Mr. Bone had alluded to the benefits introduced by the club into the neighbourhood, to which it had been of the greatest advantage; for if they took the line of hills that belonged to the district, no man could fancy the extent of that advantage unless he had previously seen them in their original state. It was not good for a farmers' club if every man in it did not speak out whatever he knew. It did no good to come there and say nothing. Yet a great many members came there and never spoke out at all. Nor was there any good in adhering merely to one side of a question. Agriculture could go much further than it had yet gone. He thought that it might assist the landlord as well as the tenant. Mr. Calcraft had alluded to the propriety of his admission to the club, because Mr. Calcraft was a landowner, and at first sight the club appeared to be merely a farmers' club; but what did that mean? It meant a club devoted to the benefit of agriculture at large—to the benefit of the landlord, the farmer, and the labourer, all of those three interests being bound up in one. They should be happy, therefore, to see the landlord amongst them, if he came to meet the tenantry, and to hear their discussions month after month. The tenant could not go on single-handed; and if the landlord came in that spirit, they would be happy to see him, that he might see in their discussions what it was that they really required; but if he came not in that spirit, he ought to be expelled the club. If he came to them as Mr. Calcraft had come that night—let him come. If the landlord and the tenant went hand-in-hand together, England might defy the world. He was happy to see Mr. Calcraft becoming a member of the club, and hoped he would continue to be one for some time to come. The advantages of such clubs were too numerous to relate; but in a few words he had given the heads of his opinion regarding them; and he hoped that he had not said anything that might be disagreeable to anyone on the subject of landlords entering the club. His (Mr. Saunders's) was only one opinion; everyone had a right to his own opinion. If the landlord came there to see what was wanted, he would find that they wanted only a fair day's pay for a fair day's work, that they only wanted interest upon their capital; but if he did not come, he might think that the results of farming were double what they really were. He would find that the farmer did not get more money than was his due. Look at the manure bills. Good crops were not all profit: but, if the landlord was willing to spend a shilling, the farmer was willing to spend a shilling too. He had omitted to say that he hoped the young members of the club would, more generally than they did, take up subjects and introduce them for discussion, and thus the opportunity would be given to the elder members of setting them right. He thought that in this view of the matter the clubs were good schools for young men.

MANURING ROOTS.

Mr. FOWLER said he would observe in regard to the subject of their discussion that evening, but without attempting to detract from the course that had been pursued by Mr. Reader, in using so enormous a quantity of manure for his roots, that he coincided with his friend Mr. Bone. They might draw an inference from what occurred in managing grass lands; when they placed manure upon grass lands the stock did not thrive so well. On a field of his own, some large swedes were grown on a spot where there had been a dunghill; and he had been curious to ascertain whether a solid inch cut from these large swedes weighed as much as a solid inch from the ordinary-sized swedes in other parts of the field? He tried this, and found that the solid inch from the ordinary swede considerably outweighed the other: he did not go to grains and minutiæ, but the fact was so. He did not wish to raise a discussion on the point of Mr. Reader's largely manuring; but he agreed with his friend, Mr. Bone, that they might gather some practical information by considering the difference in value betwixt large and ordinary-sized roots.

Mr. READER said: With regard to the size of roots alluded to by Mr. Bone, he (Mr. Reader) never meant to compare a large root grown, say in a bog, with a root of the same size grown on strong land; for he was convinced that, if they grew large roots on bog-land, they would not prove of equal quality with roots grown on stronger land. But, still, they were not very liable to err in that way. They rather erred, he was afraid, the other way; and, for one mistake they made in growing roots large, they made fifteen in growing them too small. The largest he had raised this season had been given to his running store pigs, and that was a pretty good test of their feeding qualities: he assured them that these pigs had had nothing else this fall (Hear, hear), and that the sows in farrow had had nothing but the trimmings of the roots. He was glad to say that there were not a few of them that were not hollow; in corroboration of which he should refer them to Mr. Watt, who had cut them. A square inch, cut from a root which had grown in a "mixen," was hardly a fairly sample of a field; for it was seldom that they made a "mixen" all over a field. But, no doubt, were they to take a square inch from a root grown on strong land, and another from a root grown on boggy land, they would find the square inch grown on the strong land considerably the heavier. If, however, the error alluded to did occur, it was seldom on the strong land of their hills, where there was acid enough to dissolve the bones, and not a particle remained in a short time; for the land ate all up.

Mr. DARBY, of Lytchett, in an able speech in support of Mr. Bone's view, said that it was better to grow medium-sized than large roots, which, before they were pulled, began to decay; and related an experiment in which he had succeeded in rendering fusty hay edible by steaming alone, without the aid of salt.

Mr. RANDALL took up the point, into which he said the question raised by Mr. Bone resolved itself: whether turnips had better be sown in 18-inch drills 9 or 10 inches apart, or in 2-feet drills 14 or 15 inches apart? It was, in his opinion, the 18-inch drill, yielding a moderate-sized turnip, that gave the most crop and the best feed for stock, He also alluded to a peculiarity of the club. He had scarcely ever known one member of the club carry off the best prize for two years running, the successful candidate being almost always sure to be beaten next year.

Mr. CLARKE only rose on being loudly called for, and gave the following very interesting account of his produce. He had grown upwards of twenty acres of roots, not very large, but, as Mr. Symonds, who was the judge, could tell them, tolerably good. His system was a four-course one. His first sowing had been on the 10th of May, his next 14th May: to the baulked-up land he had applied 12 cart-loads of dung, prepared in the field, and spread upon the baulks 8 cwt. superphosphate and 1 sack of bones, and it had been his intention to use 1 cwt. of guano when using the horse-hoe; but he had not had an opportunity of using the guano, the season being so dry that it seemed like throwing it away. Taking up 4 square rods of mangel, he had honestly divested them of all tops and roots, put them on the weighing-machine, and, although he had not been asked the weight, he should state it: it was 89 tons 18 cwt. The roots were regular, uniform, and, notwithstanding that the season had been so dry that at one time there was scarcely a leaf to be seen on them that had not withered away, they had turned out a very good crop, and would keep his stock for the winter.

The conviviality and discussion were kept up till 10 P.M., when the company dispersed.

HEXHAM FARMERS' CLUB.

The annual meeting was held at The Grey Bull, Hexham, on the 12th of January. The following were appointed the officers of the society for the ensuing year: Secretary, Mr. Lee; President, John Grey, Esq.; Vice-Presidents, W. B. Beaumont, Esq., M.P., John Errington, Esq., Mr. Nicholson, and Mr. Brown: Committee—Messrs. William Trotter, Goodrick, Dodds, Harle, M. Stephenson, Cook, and R. E. Ridley.

At half-past two about seventy of the members sat down to dinner.

The chair was occupied by John Grey, Esq., Dilston House.

The CHAIRMAN gave in succession the loyal toasts. He then called upon the secretary to read the following

" REPORT.

" In presenting the twelfth annual report the committee have again the satisfaction of stating that the society continues to increase, and has now 164 members, with a balance of £35 1s. 11d. in the hands of the treasurer. The committee have to express their thanks to those members who have so ably introduced subjects for discussion. The monthly meetings during the past year have been well attended, at which discussions took place on the following subjects:—Jan. 13, 'The landlord's interest in a lease, and its tendency to promote good cultivation;' introduced by John Grey, Esq., Dilston. February 10, 'On farm accounts;' introduced by Mr. J. Lee. March 10, 'On the prevention of diseases among farm stock;' introduced by Mr. Woomack, Shildon Hill. April 18, 'On hay-making;' introduced by Mr. William Trotter, East Acomb. Oct. 13, 'On the prevention of diseases among cattle and sheep;' introduced by Mr. Woomack, Shildon Hill. Nov. 17, 'On the selection of agricultural seeds;' introduced by Mr. C. Reid, Humshaugh. Dec. 8, 'On harvesting corn, and the advantages of mowing over reaping;' introduced by Mr. Harley, Mill Hills. The premiums given by the club for the different operations in harvest-work excited great competition; there having been 44 entries for mowing, 10 for binding and stooking, 21 for taking up and sheaving corn after the mowers (by women), nearly the whole of which work was done in a most satisfactory manner. Only two reaping machines were brought into operation; that of Burgess and Key attracted great attention, and did its work remarkably well. The committee beg to suggest that premiums be again offered for the best mowing, taking up corn, &c."

On the motion of Mr. STEPHENSON, the report was adopted.

ON THE DESTRUCTION OF WEEDS.

The CHAIRMAN then said it was now his duty to bring before them the subject of the day's discussion, and he begged their forbearance. That he had not put pen to paper on this subject, and that he had been able very little, indeed, to consider in what manner it ought to be brought forward, he begged them to believe was not out of any disrespect to the club, or from any want of cordial feeling towards its rules, but merely that his time had been of late very constantly and very anxiously exercised; so that he had come there with the mere purpose of opening to them a subject which he believed was so familiar to them all as to be rather one which must be dealt with in conversational discussion than in the manner of any lengthened lecture. It was not one of those subjects which was very imposing, as embracing any particular or high principle connected with the legal tenure of land, or with the rights of landlord and tenant. It was, however, notwithstanding this, one of the very greatest importance in all the round of agricultural practice. That any man of common sense should expend money in purchasing and applying manure to his land for the purpose of growing weeds, was too great an absurdity to be for one moment entertained; and they knew that the perfection of cultivation was to have the land they were occupying in such a condition as to grow merely that crop which they intended to produce, and to grow it to the greatest perfection. It would be unreasonable and absurd in any man to think he would employ cultivation and manure upon a field which he had sown with wheat, and then to let it expend one-half of its fertility in producing docks and thistles. It would be equally absurd for any farmer to give such encouragement to the noxious weeds which were grown as if he were to sow them for the purpose of rearing them. It happened to him about two years ago—at least the last time he was requested to take any part in the proceedings of the Royal Agricultural Society of Ireland—to have remarked, in passing through that country, amidst many luxurious crops, a very great proportion of weeds, of course taking away from the bulk of the crop in the first place, and considerably injuring the sample of corn in the other. He was called upon on that occasion, in the presence of the Lord Lieutenant and many of the aristocracy, to give an address to the people of that country upon some subject which he thought might be beneficial. The show of that day was a very magnificent one, and he might have taken a laudatory strain, and have praised the people of Ireland for the great exertions they were making, and the great success they had achieved in the breeding of stock; but he took that very subject which happened to be the subject of their discussion that day—the absurdity of allowing their land to be drained by noxious weeds; and in consequence of that address, some discussion had been going on in that country lately, and a paper had been sent to him, from which he read an extract. Now, if there be any truth in this (he continued), that by a clean system of farming in Ireland, one-fourth, or even much less than that, of the produce would be increased, how well must it be worth the while of the cultivator of the land to do all he could for the destruction of the weeds! It was very true that the man who might expend something in cleansing his own field of weeds was not very much advantaged if his neighbours all around him allowed theirs to go to seed, and even if the road-sides—as he was sorry to say was too often the case in this country—were allowed to grow thistles and docks, the seeds of which were spread about by winds, and carried down ditches by floods, and so deposited on the lands below. There were various kinds of weeds which required very different treatment; some, such as the dock, thistle, and others, planted their roots in the ground, and could not very well be extirpated except at great pains in extracting them individually as they grow. This was an expensive and slow process, yet it was well worth their while to do as much in this line as they could. There were other weeds which they had most to contend with, and the process of fallowing well, and careful hoeing, and clearing the drills of the growing crops, was perhaps the only true mode of overcoming these their annual weeds, such as wild mustard and chickweed, and worst of all, that enemy to cultivation, couch grass. The first step, as he conceived, in obtaining an entire clearance of weeds of this description, is to have the land properly drained; for draining was the great cardinal virtue of agricultural progress. If they happened to be going over a farm, as was often his case, and saw a spot in a field more brown and less fertile and more productive of weeds and couch than another, they were told, "That is a wet spot: we can't get it well worked." But then there was such a thing as draining to extract the wet; and in other cases they found that if a portion of a farm was very foul, the excuse for this was, "It was a wet summer when it was last in fallow, and we could not get it cleaned." There was great truth and reason in these things; but the only way to overcome them was to take the wet out of the soil and to make it uniform in its surface, so that the same manner of work and the same kind of cropping will be equally suited to the whole of a field. These were subjects that he hardly need detail to a company like that, because they were matters of practical knowledge that were before them, and they were subjects of everyday experience; at the same time, it was perfectly allowable, when they were met together to endeavour to improve the management of a district and its farming and general produce, that these things should be taken under their very serious consideration. Another subject—that of fallowing, which was one of the greatest possible importance—had lately been very much discussed, and great recommendation had been given to autumn fallowing. It had been said by very good judges that if they wished them to judge of tenantry let them look over their farms in autumn, and that the best tenant would be seen by the cleanness and style in which the fallowing had been done; he did not mean bare fallow alone, but a fallow which consisted of green crops, put up in such a way that horse hoes, hand hoes, and all the implements used for such purposes, could be employed. Last autumn gave a good opportunity, which he was happy to see made available by many farmers, for cleaning the land and advancing the work for the ensuing spring. The spring might not happen to be so favourable as was the autumn. He had, in his small way—it was too small for him to presume to set himself up as an example of good farming—but still, if there was safety, economy, and advantage upon a small scale, that advantage and economy must tell in the same proportion upon a larger scale. It happened to him that he had only a small patch of ground, in which was about ten acres of turnips each year, and he had only one pair of horses to do that, carry his coal, and everything he wanted. It therefore required him to economise the labour; some part of his land was rather strong and heavy, not very congenial for turnip soil, although he had a portion of that too, though if it were worked and laid flat in the common way in the spring, and then should get a very heavy fall of rain, it would run together in such a way that his poor pair of horses could never again overcome it, or put it into such a condition as they all knew was necessary for the production of a turnip crop, because the small seed of the turnip would not vegetate, and could not grow well if the soil into which it was put was not equally minute in its particles, and as near in a state of powder as might be; but if land with a little dampness or tenacity in it requires to be worked up late in the season, he needn't tell them, practical farmers, what a difficulty there was in overcoming that loss of time, and in getting a crop of turnips. The plan he had followed—and he hoped they would not think it presumptuous in him to name it to them, and they could follow it or not—was this: He began, as soon as the crop was stored, or as soon as possible, with skim-ploughing the surface, harrowing and raking it together, and carting it off, putting it into the fold-yard to be the nucleus of the manure heap for next year. He then gave the land a deep ploughing, harrowed it, and put it into drills ready for the manure. When the manure was put in he reversed the drills, and so it lay, and nearly one-half of his turnip land was now in that condition, drilled, manured, and exposed to all the changes of the atmosphere during the winter. It came to be found in a mellow condition in the spring, and the turnips were sown upon this; whereas, as he told them before, if the land required to be worked up in a damp state, he could not make turnips of it at all, and for the few years he had practised this, he had never failed in finding that the turnips sown upon that portion of the land came quickest into leaf, and overcame in the shortest period that great difficulty of rearing a good crop of turnips—that of coming quickly to the hoe. He ascribed it to this reason: the land upon the top of the drill was exceedingly mellow and fine; the manure had been undergoing—not the fermentation which it got when thrown into great heaps, where it dispersed its ammonia into the air, and wasted much of its best virtues—but it underwent the slow and quiet process of fermentation throughout the winter, covered up with soil; and they found in the spring all the soil contiguous to the manure in a soft and brown condition, having inhaled much of the virtue which the manure had given off. It was generally the practice to use some kind of extraneous matter with that from the fold-yard; the manner of doing this was only to run the drills over with a light harrow of any kind, but more especially with those little concave harrows of which they had seen specimens—one horse drawing two, and doing two rows at one time. This puts the top of the drill a little on the bite, and the guano, bone-dust, or other manure sown was set up to a top of the drill by passing a double mould-board plough through it. The seed was sown upon this portion of the soil; and he believed Mr. Lee and other neighbours that might have seen his process would bear him out in saying that the produce had not only been very quick, but very good. He thought this a matter important to be considered, because the quantity of turnip land in this and other countries was much increased, and naturally so, from the introduction of extraneous and foreign manures, which, together with draining, allowed farmers to go over a much larger surface. If, then, by such a process as this there was an economy of labour, and if that economy was at the same time connected with success in the production of a good crop, it could not but be a subject worthy of their consideration. He invited discussion, and said he should be very glad to answer any question relative to the subject. On that and all occasions he should be most happy to do his humble endeavours to promote the welfare and advancement of the agriculture of Tyneside.

Mr. Dodds had always followed the practice recommended by the Chairman, of getting his fallow clean in the autumn; and the mode he took to do so was very simple. If the land was light, he simply put the grubbers through it, and commenced harrowing and hoeing, and if necessary raking. If the land was at all stiff, he took an ordinary plough—several had been invented, but they only added a great many implements to the farmer's stock, and were expensive to obtain—with a few broad shares, and it could be used with or without the mould-board. He got out the twitch with great facility by simply cutting the roots with the mould-board of the plough; but a little bit of sheet-iron instead of the mould-board would make the twitch come out much more readily than if turned over altogether on its back, or left lying. After going over it once with grubbers and hoes and rakes he grubbed it again. The land cleaned much more easily in autumn than if the tools were left to ramify during the winter. If they set to work immediately after harvest, especially on dry lands, to get out the twitch, the work would be greatly lightened in spring.

Mr. Loraine wished to impress the importance not only of destroying the weeds, but of destroying them at the proper time. The greatest enemy to the farmer was the thistle—a weed whose seeds blew far and wide caused an immense expense, and caused the corn to reap badly. When thistles were not cut till they were a certain height, they ripened, and the seeds were blown in all directions. He asked Mr. Grey to suggest the right time for destroying thistles.

Mr. Bird said he had about seventy acres of land, ten of which were in turnips. The great seminarium of twitch grass was the seeds. On dry lands he pushed on his seeds as well as he could, with a little assistance from nitrate of soda; he cut them before they were well seeded, and then he afterwards got a crop of turnips. Then came barley and seeds, and he took care to cut them before they were shedding their seeds, and in time also to get a very good crop of turnips. Then he came with barley afterwards, and sent his work-people to see if any weeds were left; they found very few left; and after he had had four years' experience of this practice, he had no necessity to gather a weed, because the land was clean. A farmer, having a sixteen-years' lease, could save the expense four times over before the lease was out.

Mr. Lee found no difficulty in letting grass remain two years and having the land clean. He did not find "quickens" so great an enemy as wild oats and mustard. In a crop of barley there was a difference of four bolls an acre where mustard grew and where it did not. A few years ago he had a loss of £3 an acre where wild oats and mustard grew in a field of fifteen acres of wheat. Weeds were a great nuisance, and took a great deal of nourishment from the turnips.

Mr. Cook showed that the practice in the valley of the Tyne would not work well on the hills.

Mr. Smith had tried for a good many years a system of laying manure in the back end of the year, and drilling up the land; he found it entirely fail; but his land was on the hill-side, and the storms broke up the furrows, and washed the best soil to the bottom of the hill. He quite agreed with Mr. Grey, that the manure should be laid on fresh.

The Chairman believed there was a time when they might destroy thistles, but it was neither at their earliest growth nor when too ripe, but when the stem near the ground was so far matured as to be a little hollowed, so that the first rain fell into it and rolled it down. He believed there were no means of eradicating wild oats or mustard but by first allowing them to vegetate and then pulling them out. Wild oats might be one hundred years in the land, and still vegetate when brought to a certain distance of the surface.

LABOURERS' REGISTRATION OFFICES *versus* STATUTE FAIRS.

In the agricultural discussions of the past year, a paper by Mr. John Marshall, of Riseholme, Lincolnshire, on the maintenance of farm-servants, occupies deservedly a very prominent position. Himself a practical man, residing in one of the best-cultivated districts of the kingdom, Mr. Marshall spoke more especially to his own experience. This would appear, indeed, to have had only one drawback—it was almost too good. The hinds of Lincolnshire were certainly the happiest race of peasantry under the sun, while rumour went on to say they were also the best servants. They really showed some return when well cared for. In detailing his practice Mr. Marshall went on to say how he paid his men, and where in accordance with the custom of the country he obtained them. He referred of course to the district Statute or Hiring Fairs. He stated at what times his people were permitted to attend them, for the purpose of finding fresh places. And he did all this without in any way denouncing the means which lead to such an end. On the contrary, it would come rather as part of a system, which as a whole was proved to work remarkably well. In the autumn of this same year the reverend Mr. James read another paper on much the same subject, and at the same place—the Central Farmers' Club. In the course of this, the latter took occasion to directly denounce these Statute Fairs as "the labourer's curse":—"Let us consider that dangerous age when our lads think themselves their own masters and beyond control; when they leave the roof of their parents, or first employers, and sauntering forth perhaps to a statute fair (which is, I maintain, the labourer's curse), let themselves out for a mere twelvemonth to any master who may engage them; at the expiration of that time setting off again to meet with another master, a new home, and new companions, hardened perhaps in crime and villany, considering themselves mere migratory beings, with now little or no religious character, no sense of Sabbath duties or Sabbath observance, and nondescript in feelings, habits, and views, instead of the upright, handy, diligent, skilful, trustworthy servants of which we talk, but take so little pains to produce." Now there is palpably a great deal of this in direct opposition to what Mr. Marshall had already told us. He showed us that lads and men hired at statutes might be, and were, steady and diligent; that they did attend church; and that, perhaps, in no other way were they so certain of becoming skilful and trustworthy labourers.

It is only right to say, however, that Mr. James, as a clergyman, by no means stands alone here. Indeed, the two classes seem very much inclined to join issue on the subject. The clergy say these hiring fairs are most terrible evils, conducive to all kinds of vice, and that they ought accordingly to be done away with. The farmers, on the other hand, see no great harm in them—and maintain, moreover, that it would be difficult and inconvenient to do without them. This very argument is now being discussed in Mr. Marshall's own county. At the instance of the clergy, a meeting has been held within these few weeks, in Lincoln, with the object of establishing a "Servants' General Registration Society," that is to say, a register-office which shall embrace equally in its operations domestic servants and farm-labourers. The Bishop of Lincoln opened the proceedings. After speaking to the defective education of the poorer classes, his Lordship went on to say, "There is another disadvantage to which our farm-labourers are subject—the early age at which they leave home. I do not mean simply the early period at which they are sent out to work; but the youthful age at which they are put out to service at a part of the county very far from their home, so that long before their character is formed they are removed from the reach of those influences by which character ought to be formed—not only from their parents, but from those to whom they have been taught to look up—and they are often thrown in contact with bad characters, whose influence begins to act upon them. Added to this is the great disadvantage, as I must think it, though it is to a great extent perhaps inevitable, of the annual changing of situations. This, I am aware, cannot, to any great degree, be obviated, because as the boy's or girl's labour becomes of greater worth in proportion as they grow older, and as their masters or mistresses may not require just that kind of labour, they must seek to better themselves elsewhere. But I have reason to believe that the almost universal practice of these changes arises in a great degree from the custom of the country, and from the will of the children themselves, who seem to consider it quite right that every year they should remove to a different situation. However this may be, I believe that this practice, conjoined with that of not requiring character at these hirings, is the cause of an almost incalculable evil. It results from this—and I beg you, gentlemen, to mark my words—it results from this, that a good character is of little or no value to a farm servant. We know that in the case of ordinary domestic servants, their good character is their capital. It is that on which their success in life depends. They know that if they lose it they must be content, perhaps for the whole remainder of their lives, to put up with worse situations, both in point of comfort and remuneration. But our farm servants are without these motives. Hired without any inquiry into their character, they feel that it is of no consequence to them to acquire a good character in their present situation, because they leave it at the end of the year, and it is of no greater advantage to them in their future situation, because in all probability it will never be asked for.

I have to add to this the subject which is more immediately before us at the present meeting—the evils of statute-hirings—or, it would be more correct to say, the evils of the statutes at which our farm servants are hired; for there could be no objection, of course, to hiring at statutes were it not for the sights and scenes to which these young people are exposed on such occasions. Those you know better than I do; I will only call to your mind that at the annual statute these young men and women—or rather, boys and girls—have their one great holiday in the year, when, relieved from their labour of the past year, they are excited and more liable to impressions from without than at any other time; that they meet together in crowds in one of the towns, without the eye of their parents or friends upon them, surrounded with temptations which the publicans and others put in their way, and without any check upon them, or very little, for the fear of losing their character, or the wish to maintain one they have already obtained. You are well aware that it is scarcely possible to pass through a town, or a road in the neighbourhood of a town where these statutes are going on, without seeing enough to show how much mischief and immorality they must occasion; and I believe there is many a man and woman who has had to rue to the end of their lives the evil which they have learned there." The Bishop concluded by thus summing up the assumed advantages of the new plan: "It gives a value to character (and that is a very great point); it renders unnecessary, at any rate, the hiring at statutes; and it encourages—indirectly certainly, but still it does encourage—the servants to remain more than one year in the same situation."

The next speaker was one of the best farmers in the county, the well-known Mr. William Torr of Aylesby. It will be impossible for us to follow him throughout the whole of his very telling address, but we may give the chief points in answer to what had already been advanced:—"The hiring of farm servants was a different thing to the hiring of domestic servants. In the first place it was positively essential that the farmer should see the men he wanted to hire. In order to do this, there could not be a better arrangement than having a day when both classes should meet and have a choice. The Bishop said that characters were not reckoned of any consequence on such occasions; but he (Mr. Torr) believed that characters were generally inquired about in the case of the better class of servants. He was free, however, to admit that characters had not been sufficiently attended to, but that was not the fault of the statutes; it was the fault of the masters, who did not attend the statutes, and who were consequently not there to speak to the character of the servant who was looking out for another place. Now, supposing registration offices were established throughout the county (though he did not believe them to be practicable), how would a farmer be able to make his selection? Say there were two names down—one William Smith, who had lived 19 years with Mr. Brooks, and the other James Brown, who had lived 19 years with Mr. Iles, both wanting situations as waggoners, and having good characters. He (Mr. Torr), wanting a waggoner, might pitch upon William Smith; and when he had an interview with him might find that he was knock-kneed, very weak in the back, with an excellent character, but not an atom of use as a waggoner, while he had lost the chance of obtaining the other man Brown, who was a strong active fellow, and just the man he wanted. Such a system would never do. But in the statute you could pick your man out. It might be called a white slave market; but he maintained that it was the best way of doing it. A man had a right to make the best bargain he could—the master in getting his labourer, and the labourer in disposing of his services; and both of them had the best chance in these statutes, where a large number of them met for the purpose. He thought that the statutes had been overtaxed with an enormity of crime. He was free to admit the immorality that prevailed on such occasions, but he meant to say that whenever her Majesty's subjects met together in large crowds, there was the same sort of thing—whether it was a statute, or country fair, or an excusion train (which he believed presented the worst scene of all), or at Epsom or Doncaster Races."

Then, again, as to what certainly looks at first like a weak place in the system, Mr. Torr explained that—"The changing of servants was a matter of necessity rather than choice on the part of both masters and servants. He found, as a master, that if he hired a boy to mind a pair of horses, and kept him a second year, when he would have to mind four horses, he was not as well served; so he gave him a character, and the boy got another place, and the change was better for both parties. He (Mr. Torr) would be sorry to do anything that would tend to lower the agricultural status of this county, believing that they had an excellent lot of labourers now, and that registration offices would by no means improve them. He had the lowest possible opinion of the existing registration offices." Mr. Skipworth had also "a very poor opinion of registration. It would be impossible for a man to hire all his labourers in that way: he would be travelling two months in the year to select his servants. As to character, when a youth conducted himself well, the master or his foreman was there at the statute to say so, and a more truthful character was obtained in this way than could be procured by any registration-office. The remedy proposed was totally impracticable." There were other speakers for and against, but the argument is almost altogether embraced in the speeches of the Bishop and Mr. Torr. As the feeling of the meeting was seen to be going against the proposal, an attempt was made to show that in the establishment of register-offices there was no desire to abolish the hiring fairs. If, however, the movement meant anything, it must have tended directly to ignoring the latter. And the farmers, to whom, as the Bishop admitted, the consideration of the subject most properly belonged, would not have the proposition on any terms. The formal resolution to establish a "Servants' General Registration Society" was met with an amendment that the institution be rather called "The Lincolnshire General Servants' Amelioration Society"—and the amendment was carried by a very large majority, the numbers being thirty-one to seven.

We confess that our opinions go very much with this majority. There has been a vast deal of overstrained sentiment about our "white slave markets"—Where Will stands with a bit of whipcord in his wide-awake, or Jack mounts a curl of wool from his last place; and Mary comes in hopes of getting a better place than she ever would in her own hamlet. Beyond this, we do not quite see the sin or danger of a boy or girl going a little way from home. It is well known that our domestic female servants never do better than when they are out of reach of the meddling influence of "mother," or the continual promptings of some neighbour Busybody. We are not so sure, either, but that boys may become sharper, quicker, and abler men from the same change of scene—one, that in a higher station of life is considered almost a necessary part of their education. Of course they are never left entirely to their own control, and we cannot but refer again to Mr. Marshall's essay as to how they do really fare and prosper.

The immoralities of the Statutes might, as was suggested, be corrected; although even these we fancy have been a little overcoloured. Moreover, if Jack and Gill are not suffered to go to "a statty" they will go to a pleasure fair, or have their holiday out some way or other. These wholesale attempts to interfere with or revolutionize the habits of the lower classes have never, so far, resulted in much good. The Statute fair may be made more orderly, but for either master or man it is about the most just principle that has ever yet been devised.

Perhaps of all districts Lincolnshire was the last in which we might have expected to have witnessed such an agitation. The county has long been proverbial for the excellence of its agricultural servants, the good terms on which they stand with their employers, and the liberal manner in which they are treated. As Mr. Torr said, and said well, too;—

"He had had the good fortune to visit nearly every part of Her Majesty's dominions, and he had taken a special interest in the rural population of the three kingdoms; and he could say, 'without fear, favour, or affection,' that the Wolds of Yorkshire and North Lincolnshire possessed a peasantry equal, if not superior, to that of any other district. The only place he could point out as their equal in such a respect was the north part of Northumberland, where the cottage system existed in its perfection. He should be sorry to see the north of Lincolnshire copying from the south of England, where there were no statutes, but where the labourers were in a most miserable condition. The farm servants of North Lincolnshire were, however, comfortably housed and really well kept."

Is it not rather dangerous to interfere with the customs of people doing as well as these are?

USE OF GAS-LIME.

[In all our larger towns where gas is used for lights, there is a considerable quantity of waste lime thrown out from the gas-houses, lime being used for passing the gas through to purify it. We have various reports from farmers who have tried this, some in favour, some that it has no effect, while others have condemned it as rank poison to crops. Several inquiries have recently been addressed to us, one of which, from F. S. Hawley, of Binghampton, N. Y., we forwarded to Prof. S. W. Johnson, of the Yale Analytical and Agricultural School, requesting an opinion. His reply will throw some light upon the subject.]

TO THE EDITOR OF THE AMERICAN AGRICULTURIST.

The various contradictory opinions held among practical farmers, with reference to the value of gas-lime as a manure, are justified by the extreme variableness of its composition. When perfectly fresh from the gas purifiers, it is in general a rather dangerous application to any growing crop, or in contact with seed. Mr. Solomon Mead, of New Haven, Connecticut, informs me he once applied it in the hill to potatoes, and they never came up. A gentleman in Wallingford, Ct., applied it to grass land and to the roots of peach trees. The trees were destroyed, and the grass severely scorched, so that it did not fairly recover until the ensuing year.

It may be used in the fresh state upon naked fallows, especially when it is desirable to free the soil from slugs, injurious worms, or couch grass. What its action is upon vermin may be inferred from the fact that when fresh it contains a substance (sulphide of calcium) which is the actual ingredient in the depilatories and cosmetics, which are articles employed for removing hair. There is an account of its being thrown into a hog-pen with the intent that the swine should incorporate it with the compost heap. This was effectually accomplished, but at the expense of the bristles and hair of the hogs, which were, in a great measure, removed by the operation.

It is thought, too, that the odour of the coal-tar, which is mixed with the gas-lime in greater or less quantity, serves to dislodge insects and vermin; and it is sometimes sown in small quantity over young turnip-plants to prevent the attacks of the turnip-fly. In Scotland, it is largely applied to moss-land which it is intended to reclaim.

The quantity of easily soluble matters (sulphide of calcium, sulphite and hyposulphite of lime) is so variable, ranging, according to analytical data, from 2½ to 15 parts in 100, that we may readily comprehend how some gas-limes may be quite harmless if applied in moderate doses even to growing crops, while others, rich in these soluble and deleterious matters, destroy all vegetation.

It has been supposed that fresh gas-lime is valuable on account of the ammonia it contains. When the gas-lime is emptied from the purifiers in which it has been exposed to the gas, it has quite a pungent odour of ammonia; but the quantity, though enough to affect the nostrils, is in reality quite too small to have any great manuring value, and quite disappears after a few days' exposure to the air. Mr. Twining, of this laboratory, found in a specimen of perfectly fresh gas-lime, from the New Haven gas-works, but eight-tenths of one per cent. of ammonia. In a gas-lime from the gas-works at Waterbury, Ct., which had been exposed to the air for one week, he found but about four-one-hundredths of one per cent.

Fresh gas-lime may be advantageously used in composting swamp muck, &c.

By full exposure to the atmosphere, as when scattered over fallow-ground, after a time it becomes innocuous. The soluble caustic ingredients are converted into no less valuable a substance than gypsum (plaster); and then, after its odour and bitter burning taste have disappeared, it acts precisely like a mixture of lime and gypsum. How rapidly these changes take place, I have no means of knowing without making actual trial; but should presume that if a dressing of gas-lime be incorporated thoroughly and uniformly with the soil one week before sowing or planting, no harm could result to the crop.

In conclusion, your correspondent is recommended to use it, if he can get it more cheaply than other lime, at the rate of fifty bushels per acre on heavy soils, or ten to twenty bushels on light soils, making one application in three or four years. If fresh it should be put on the bare soil, and not on a crop. In case of corn or potatoes, it may be scattered between the rows, and worked in at hoeing time. If the gas-lime is white and tasteless after exposure to air for a time, it may be sown like gypsum.

It should be remembered that a wet soil will not be much benefited by lime, nor by any manure, unless in a dry season; and that a light dry soil is soon spoiled by lime, unless a good supply of organic matter be maintained in it, by means of stable manure, muck composts, or green-manuring. Lime and plaster, too, are at the best, even when they exhibit their most extraordinary effects, but partial fertilizing agents. S. W. JOHNSON.

DRILLING OF CROPS.

It was observed by the late Earl of Leicester, better known as Mr. Coke, of Holkham, that the Scotch farmers were most excellent cultivators of the soil, in that they drilled every root crop, as he had adopted that system *from them*; and at the same time they were the very worst imaginable in sowing the grains in broadcast, for he had used the drilling in rows of the culmiferous crops. The same very enlightened and patriotic individual strongly advocated leases of twenty years, and continued the threshing of grain by flail. The judicial Lord Kames of Scotland, who lived about 1770, very strongly recommended leases of twenty years, and as strongly urged the superiority of the ox over the horse for farming purposes, wondering all the while that a wilful blindness of daily growth seemed to prefer the horse, which was superseding the ox. The quick perception and powerful intellect of these gifted and enlightened individuals failed to rid the prejudice that threshing machinery diminishes labour, and to see that grain crops only reap the benefits of the root crop preparation, and do not confer any benefit on the land. The same organ which established the very large benefit of twenty years' leases, failed to perceive that nature has decided the superiority of the horse over the ox, for farming purposes, in the muscular formation of the animal, and that quick motions are in almost every kind of operations more effectual than sluggish actions of distant repetition. The late George III. farmed for thirty-two years at Windsor for the express purpose of showing that oxen were superior to horses, and the very contrary was proved; just as the chemists discover new things, or contrary things, in the progress towards an object which was intended. When prejudices surround and encumber such minds as have been mentioned, no wonder need be made that the common cultivators are tied and manacled by apathy and mental servitude.

The question between thrashing by machinery and flail is soon settled: the very object of machinery is to diminish labour on non-productive points, and to apply it to the increase of production, and not to the cost of manufacture, than which there can be no greater blunder in social economy. It relieves manual labour from the most brutifying performances, and leaves to it the nicer operations that are beyond its sphere of application; for machinery has its limits prescribed. The question of leases needs no discussion, but the drilling of crops may admit some useful notices.

The drilling of root-crops at the distance of twenty-six to thirty inches is certainly the most eligible practice that has yet been devised for the purpose of cleaning and pulverizing the ground, destroying the weeds, applying the manure, and preparing the land for the future crops. The drills are opened by the common plough, the dung is spread evenly along the hollow intervals, the drills are split by the plough, and reversed over the dung, when the seeds are immediately deposited in the freshly-stirred soil. This mode is most admirable in Scotland and the North of England, where the climate affords frequent rains and many dews, and where the soils are cool from being fresh-water loams of alluvial formation, that are superimposed on the primitive rocks. Over the southern half of England an arid climate succeeds, and a totally different geological series of deposits; marine clays, oolites, chalks, and greensands afford a most varied mixture of soils, which require very different implements and courses of cultivation. The soils are in many cases very open in the texture, and easily dried, and crumbly and cloddy from clay, and easily penetrated by drought. The Scotch mode of twice drilling the ground, by opening and reversing the drills, has been found to dissipate the moisture, by exposing the land so much during the driest season of the year; and on this moisture the success of the turnip crop almost wholly depends.

It has been adopted to sow, on the flat and drilled ground, the artificial manures with the turnip seed, by means of machines with lengthened coulters, which make ruts in the soil at stated distances to receive the contents of deposition. This method sows the seed in a parched dust on the top of the ground, which is always made during dry weather on tilled lands, and the rows being flat, the equal opportunity is not afforded, with ridglets and hollows, of cultivating the intervals with the horse-hoe. But on the lands above-mentioned, it is preferable to exposing the land by being twice drilled. All light lands are best sown with artificial manures, which may be best used in drills 27 inches apart, made with one furrow of the common plough, and the seed being immediately sown, and the drills rolled, nearly a flat state will be produced, and a fresh tilth will be enjoyed by the seed, without exposing the land to drought by lying in open drills. Two common ploughs will employ Hornsby's drop-drill, which splits the ridglets, and deposits the seeds deeply. It is an excellent implement. Light lands may be wholly prepared from the winter furrow by means of Finlayson's harrow, and being reduced by grubbing and rolling, and never turned up to exposure, the moisture of winter will be retained, and do much to secure the crop. The farmyard dung may be mixed with the land by the grubbing of the implement, and the ground drilled and sown as above-directed.

The root crops used in Great Britain are, potatoes, turnips, cabbages, and beet-root, which grow in roots in or close to the ground, and do not rise to height and impede the cultivation in pulverizing the soil and clearing the land from weeds. The horse-hoe can work during the whole season of summer and autumn, and the hoe and the hands of the weeders can be employed over the matured growth of the plants in cutting and pulling the weeds that grow upon the land. This admission of the tools of cultivation, throughout the season, constitutes the great value of these plants, as the soil is thereby thoroughly pulverized and cleaned by the operations. Beans allow a partial cultivation in the early summer; but the plant soon rises to height, and excludes the implements. The crop is, therefore, only a half-fallow; and the best use of it, in the county of East Lothian, in the south of Scotland, does not form a substitute for the bare wheat and turnip fallows. The drilling of pease and vetches is excluded, by reason of the plants quickly growing over the intervals, and prohibiting any cultivation; and the use of the plants consists in a close crop, thoroughly covering the ground, and smothering every vegetation below the shade. The land is mellowed on the surface, and freshened with moisture, and enriched with the decomposition produced by the exclusion of air and retention of moisture.

The very decisive advantages of drilling root-crops arise from the plants growing close by the ground, and thereby allowing the most complete fallowing of the intervals, and the cleaning of the whole ground from weeds. When the luxuriance of the crop does cover the intervals of the drills, there is still a liberty of hand-pulling the tall weeds, which, with the previous scarifyings and hand-hoeings, finishes the process of fallowing and cleaning the land. These facts are so undisputed, that no further comment is necessary.

The benefits of drilling grain crops rest upon a very questionable foundation. The rows are narrow, and 12 or 14 inches distant, and do not allow the horse-hoeing in any effectual way: a very slight action only can be done. The operations of the hand-hoe are equally ineffective, by reason of the scuffling of the intervals being too shallow to admit the works of the hoe: the surface-weeds are cut, but no pulverizing effect is performed. The plants quickly rise into a height that excludes all subsequent operations behind a scarifying by the horse-hoe and one or two operations of the hand-tool. These slight processes effect no beneficial purpose, beyond slightly checking the small weeds that rise first in the spring. All later growths remain undisturbed, as the tall grains prohibit any work being done. The season of performing what can be done is much too short to produce any benefit.

Green crops are cultivated to obtain the roots as the valuable part, and without maturing the seed—a purpose very widely different from the use of grain crops, which are sown for the express object of obtaining the matured seeds as the value that is desired. The latter plants derive the benefit that has been conferred on the land by the cultivation of the root crops. The very opposite nature prevents any similar benefit being conferred by the plants on the land, and the idea of drilling corn had arisen with the minds that evaded the solid, and fastened on the superficial. No decisive proof has been recorded from a majority of similar results, that the produce of grains and clovers is larger from drilled land than from broadcast sowing; and until this proof be made satisfactory for more than one year, on a field alternated in equal spaces of ground with rows and broadcast, the drilling of grain must be held as an effusion of fancy, which has no substantial evidence for its support. The farmers of the Border counties made trial of the row cultivation, but soon relinquished it, finding no benefit from the additional expense, and that close luxuriant crops of grain produced by the root crop fallowing and manuring were more effectual in smothering weeds than any hoeings of the intervals that could be done. It is an application of labour to an object which cannot derive the benefit of the intention, and therefore the expense is misapplied, and produces no remuneration.

The evidence is much more ample of the superiority of thrashing by machinery over the flail, than of drilling grain being more advantageous than sowing in broadcast; and yet the boasted Holkham farmers, and many other cultivators of repute, persist in applying labour to non-productive points in using the flail at five times the cost of machinery, and in adding the expense of drilling grain to produce no result—a weakness of intellect almost incredible in these days of inquiry, when the torture of the rack is unsparingly applied for the behoof of agriculture, on every point of tangible application. J. D.

AGRICULTURE AND POPULATION.

[TRANSLATED FROM THE FRENCH OF "LE JOURNAL D'AGRICULTURE PRATIQUE."]

The Academy of Moral and Political Science directed M. Léonce de Lavergne, one of its members, to institute and prosecute an inquiry into the actual condition of the rural classes in France; and, in order to execute his commission, that learned economist has completed a series of investigations which, in these late times especially, have attracted the attention of the most eminent publicists.

Amongst these studies there is one which presents itself foremost as an essential basis of the researches of M. de Lavergne, namely, that of the statistics resulting from the census of the population, as have been published officially in 1856. This administrative document states two facts, both important and characteristic for our epoch; first, in respect to the preceding quinquennial period, a relaxation in the increase of the population during the period from 1851 to 1856; and again—and this possesses a higher degree of interest with agriculture—a manifest depopulation of the country districts, in favour of some large cities, and especially Paris. Consequently, it was very natural that in a study of the condition of the rural classes, such facts, stated officially, should stand out in strong relief: public opinion had previously conjectured it, and the statistic surprised no one, when it came to be exhibited in figures.

We thus see a country (France), abandoning its old traditions, and inclining towards English organization, in the predominance of the urban over the rural populations. Is this a symptom of progress? or is it a symptom of decay?

There are to be found writers who, in their optimism, have looked upon this change of class in our populations as the undeniable evidence of progressive civilization. Starting upon the idea that the more agriculture advances towards perfection, the more it replaces manual labour by machinery, they are happy to find that the origination of great public works in cities has found employment for the rural populations for which agriculture has no further occasion.

The book that M. de Lavergne has recently published, entitled "Agriculture and Population," is, we may say, a true protest against these fatal tendencies of our rural populations to desert the village. Tracing to their origin the causes of this desertion, the author places in the first rank the inclemency of the seasons, and the centralization of expenditure in cities. The first has been, he says, the chief determining cause of the general depopulation of France, and that of the rural districts in particular; but (and this deserves the greatest attention) it is at the moment in which agriculture has the most need of all its resources, to struggle against the fatal influence of the seasons, that, in aggravation, it is seen to be simultaneously deprived of arm and capital by war and luxury—two causes to which are necessarily attached the centralization of expenditure in cities.

The war! it would be out of place to speak of it here, otherwise than to render homage to those rural populations, which, in that great trial of the country, have furnished so largely their contingent of men and money. But luxury! the centralization of expenditure in cities! that is another thing; for at the last analysis it is beyond dispute that amongst the causes that have attracted our rural populations into the cities, we must assign a chief place to this respective position of our cities and rural districts. In the latter, the insufficiency of the harvest, the only resource of the inhabitants, has produced misery, and closed the workshops of private labour. In the former, the insufficiency of the harvest has been counteracted, more than elsewhere, by ingenious combinations, tending, on the one hand, to sell bread below the normal price, and, on the other, to create public works upon a scale till then unheard-of. Bread and labour assured, what more was required to attract the populations? They have only too well responded to the appeal, and it is thus that in the five years from 1851 to 1856, the total population of France increased only 256,194, whilst that of Paris, taken alone, has increased to the enormous extent of 305,354 inhabitants. From whence, then, arises this excess of the Parisian population, if not chiefly from the contingent made up of the deserters of our agricultural departments?

But this is not all; for we must not only look at the figures in this question of depopulation of the country districts: we must look also, and above all, at the quality of the emigrants. Now, it has been found that the requirements of war have exacted the formation of a numerous army; here is at once an enormous tribute levied chiefly upon the most effective portion, the most productive of our rural population. But we must not speak of this, for glory is the consummation of the tribute. Let us speak of another portion of the emigration—that which has recruited the army from amongst workmen, masons, carpenters, navigators, and other building workmen. Can we believe that the desertion of these has not been more sensibly felt in our rural districts, in that, generally, it acts upon those men in the strength of life, and such as in regard to intelligence and activity might justly pass for the *élite* of the working population of our villages? Truly such questions are quite common-place; for there is no one who does not know that in the actual state of popular prejudices it is those who are the least favoured by Nature and education who are left in our villages.

The arm of ridicule is very powerful in France, but frequently it is only the shaft of wit against good sense; and such is the course of things that, sooner or later—too late, unfortunately—good sense carries the day. A day will come, therefore, in which public opinion will do ample justice for that strange accusation launched against those writers who, in our day, have blamed the extravagant luxury of the cities. They have been represented as false puritans, as men who do not comprehend the necessities of our civilization; as pessimists, who, for example, would wish to see Paris laid in ruins. This is, in reality, the disastrous war. It is not necessary that Paris should cease to be embellished: the whole question is, to hold an even balance between the expenses which may concur in ameliorating a residence in cities, and those which have for their object the amelioration of the rural viability, the clearing of the downs and mountains, the management of the fluvial waters, &c. We are beginning to engage in this course of reparation towards the poor districts; and M. de Lavergne properly qualifies as a good law that, by virtue of which the State charges itself to execute the work of planting on the plains of Bordeaux to the extent of a sum of 6,000,000 francs.

A deputy of the Legislative Corps, M. Guillaumin, justly remarked, in the discussion on the expenditure of the Budget of 1858, that out of a sum total of 1,716,986,190 francs, the budget for public agricultural works figured simply to the amount of 1,850,000 francs; appropriated to the rendering healthy or renewing the forests of Sologne, Doubes, Gascony, Brisse, and Corsica—all countries in which fevers decimate the population. Certainly, looking at these sums, the first so large and the second so small, we cannot say that the rural population have taken the lion's share. And yet, at a period in which sanitary questions, so interesting to the working classes, have assumed so much importance, what work can be more beneficial than that of rendering healthy the unfortunate countries which up to the present time have known little of our civilization except from the tax-gatherer and the recruiting-serjeant? What unknown miseries exist in these countries! which, after all, demand of the State only what it has done for the richer ones—namely, roads for traffic and sanitary works.

As a general principle, M. de Lavergne is not one of those writers who demand on all occasions the intervention of the State in matters of interest, either agricultural or manufacturing. He does not wish the State to do too many things; for he knows that that system might be construed, to the great detriment of agriculture, into an increase of taxes and functionaries. He prefers much that the country acquire the habit of doing by itself, so far as possible, its agricultural and industrial affairs; for he is persuaded that it is, above all, by the exercise of individual exertion, that a nation learns to conquer and preserve all that gives riches, power, and stability. We can only applaud such doctrines, being those of a good political economy. They teach the love of labour, and divest governments of the terrible responsibility imposed upon them by contrary doctrines, especially in what concerns salaries and the question of sustenance. To this extent, therefore, it is desirable for all, governors or governed, that the doctrine of individual initiative, thus understood, should penetrate into all social circles. The result would not be that the State would have nothing to do for agriculture; it would still be at least evident that the public expenditure ought to bear only upon objects with which the citizens, whether separately or in association, cannot be employed. Now in the actual state of things, it is certain that many great agricultural works, and operations of public utility, such as the replanting of mountains and downs, or the rendering healthy insalubrious countries, constitute in the highest degree works executed at the charge of the whole country. Compelled to become a manufacturing and commercial nation, we have for a length of time already concentrated the strongest part of our public resources in the improvement of the richest districts; and it is time that the poor ones, the disinherited countries, should, in their turns, also have a place in the budget of public works. To say that these poor districts will never reimburse by their own riches the advances of the budget, is to view a great question on its weakest side, and to forget what those countries, now provided with roads and openings, were themselves, before they became the theatre of great public works.

M. Guillaumin, the deputy of whom I have spoken already, said again, in the Corps Legislatif, in continuing his idea of public agricultural works: "Suppose that a capitalist, entering upon a healthy soil, commenced by making costly constructions, by furnishing his stables with selected beasts, by establishing from them splendid teams—by creating a museum of perfect instruments, without reserving capital to purchase manure, carry out the drainage, marling, irrigations, &c., which are, in cultivation, reproductive expenses; should we not have a right to say to that capitalist, 'You have badly arranged the employment of your funds, and have neglected the expenses productive of riches'?"

Well! it is not necessary that a State that is called France should subject itself to the same reproach. In other terms, that the expenditures of luxury and utility, for the embellishment of cities and those dispersed over wealthy territories, should at the same time overlook those great blots called La Bresse, La Sologne, and many other countries. In these there are productive expenses to be incurred. It does not simply consist in increasing our grain and cattle, but to carry labour to the hand of the workman in the field; in a word, to enable those who remain in their native country to find something else there than fern and buckwheat-bread, unhealthy pond-water, and, true penance of Tantalus, immense lands to cultivate, but no labour. And then, when this work of reparation shall have been accomplished, we might, without reverse of the medal, be justly proud of our country. Instead of progressing towards the English organization in what relates to the repartition of the populations, we shall have preserved our old and strong French organization—the predominance of the rural populations over the urban, the scattered populations over the agglomerated.

Undoubtedly the progress of mechanical agriculture, like that of mechanical manufacture, tends to the substitution, so far as it can, of the work of machinery for that of men. But does it follow that this desirable substitution has been, up to the present time, one of the causes to which we are allowed to attribute the depopulation of the country districts? Have we a right to say that the thrashing-machine, the drill, the horse-hoe, the steam locomotive, the haymaking machine, &c., &c., have in any degree whatever diminished on our farms the demand for hand labour? To maintain such affirmations would be to forget, in my opinion, that the more agriculture is improved, the greater its need of the arm—and let us mark well this fact—the arm of intelligence. This is what appears to have escaped the notice of many writers, who, on this question of population, have spoken of the wants of agriculture in men, and who understand manufacturing much better than rural economy. More familiarity with this last science would have taught them that amongst the elements that determine the choice of systems of cultivation, it is necessary, before all, to accord a very great importance to the amount of the labouring population. Show us the least populous country, and forest and pastoral agriculture reign there; ascend a ladder, and you find arable culture mingled with fallows and pasturage; see, in short, a country well peopled, and you are in presence of intensive culture, culture without fallows, culture with stabulation of cattle, and predominance of roots, artificial forage, manufacturing and garden plants, &c. It is quite true that machines are multiplied in proportion as the earth is better cultivated; but as, on the other hand, the demands of consumption increase, it happens that, up to the present at least, the increasing fertility of the soil causes the extension of manufacturing and gardening cultivation, which implies also a greater need of hand-labour. And not only are more hands necessary, but, what is more important for the working population, the rural labour formerly concentrated upon the harvest season has become better distributed over the whole year. Thus workmen are required for spring tillage, for the autumn harvests, and for winter works in the agricultural districts. Hence, less stoppage, but a more equally-balanced labour, better sustained, and better remunerated.

Such is the truth of the case. Machinery has in no respect occasioned the emigration of the rural population; since agriculture, otherwise in presence of larger outlets, has never had such extensive need of hand-labour as since the period of the improvement of machines. It is therefore not true that the attraction of the cities over the rural populations can be a good thing; nor is it true that this attraction is a sign of high civilization. On the contrary, this unclassing of the populations is a fact not to applaud, but to combat with, in its exaggerations. Let us not forget, as a last analysis, that it not with French as with English agriculture. This latter, whether it be from its markets or from the nature of the soil and climate, employs itself little except upon forages, corn, and cattle. The former, much more complex, unites to the production of alimentary commodities, those of vines, mulberries, olives, fruit trees, manufacturing and horticultural plants, in the open fields. The small culture therefore predominates over our territory; and the small culture signifies the rural population in the greatest number.

All these ideas have been developed by M. de Lavergne, in several chapters which he has devoted to the special study of cattle, machinery, agricultural and forest products. Written under the impression of the visits made by the author to the Exposition of 1855, these chapters are not simply a technical description of the objects that the several nations had sent to the great gathering at Paris. Much higher is their bearing, for they are in truth a study of the whole of European agriculture. Thus, when the Exposition terminated, the author, always pre-occupied with the condition of the rural classes, takes, at setting out, many of those ideas which, with more or less opportunity, have been thrown into public discussion.

In many of these ideas appears commercial freedom; that is to say, the suppression, or rather the progressive reduction of customs' duties exacted at the frontiers of each nation. I will not enter into the discussion of this so-much controverted question; and besides, there is not a single reader of this journal who does not know that M. de Lavergne does not in any respect believe that our agriculture is efficiently protected by the sliding-scale and other fiscal arrangements. I will only say that, in opposition to many ancient organizers of free exchange in France, who explained to us, as was done in England for the agriculture of that country, that French agriculture was enriched at the expence of the consumers, M. de Lavergne has clearly shown that enormous difference which, in this respect, exists between the agricultures of the two countries. In fact, the free-exchangists of Outre-Manche might justly support themselves upon the excessive dearness of agricultural products, and by that argument organize a league against the import duties on cereals. But in France to talk of the excessive dearness of commodities, and of the illegitimate profits of agriculture, was in truth to place the spirit of system above the reality of facts; to discredit political economy; and at all hazards, to ruin the doctrine of free-trade in public opinion. Real science, or that which is based on the study of things, ought therefore to be pleased that M. de Lavergne has re-opened this question, and placed it upon its true foundation. Such men advance the sciences slowly: it is not necessary to repudiate them because they sometimes deceive themselves; but when a principle is badly advanced, it must be replaced.

It is impossible that M. de Lavergne should not know his own opinion on a measure that would tend to nothing less than the re-establishment of an order of things incompatible with our present habits. Listen to certain reformers, and they charge the subdivision of the land with the backward state of our agriculture; they consequently demand that we introduce into our legislalation the illimitable liberty of willing property at death, and the right of entail. What does M. de Lavergne think on this subject? A partisan of free competition, he admits only one means of disallowing the sale to the small proprietor, that is, to do better than he, as may be done in certain situations. In the background, therefore, are those superannuated combinations, which, powerless to reascend the course of time, would be useful only in raising new storms. "The law of equal division," says our author, "is the flesh and blood of France. We cannot touch it without danger, at least in its essential dispositions." This is saying plainly that M. de Lavergne does not push the fanaticism of this law of equal division to a disregard of the inconveniences of the

826th article of the Code, which allows to each of the heritors to demand his part *in kind*, of the furniture and fixtures of the succession. This *régime* of absolute equality has conducted us straight to that of instalments, of enclosures of pieces of land; that is, a *régime* that multiplies inordinately the ditches, fences, rights of passage, &c.; which hinders the reform of bad distribution of crops, and the execution of great works connected with drainage, irrigation, &c. Here, then, there is something to do; and M. de Lavergne thinks that, for example, one of the heirs should be authorized to take possession of fixtures exceeding in value his share, on payment to the others of three per cent. interest, and two per cent. redemption, with the power of repaying the whole on the principle of a *credit-fôncier*.

With regard to the soil, the principal element of agricultural labour, M. de Lavergne demands the reduction, and even the suppression of the rights which involve the real property mutations. This is well spoken, and it was moreover the advice of M. Gasparin; these rights are, in fact, one of the first causes of the enormous debt of the proprietary. They bar the idea of all improvements; and one of the best means of encouraging agriculture will unquestionably be to facilitate the mutations.

Again, with regard to the soil, M. de Lavergne has met with a publicist who places the existence of communal property in the list of the most efficacious means for ameliorating the condition of the rural classes. Upon this, a protest is urged by M. de Lavergne, who knows very well that the land that is every body's is nobody's, and who, in that frame of mind, reproaches the communalities when they go beyond a certain proportion with the population, for the maintenance of poverty, idleness, ignorance, and thoughtlessness.

After the soil come capital and labour. Here agriculture is, it may be said, in presence of two deserters, who have given notice of passing over to the enemy. The enemy ! that is undoubtedly the true expression, when it is intended to point out those manufactures which do nothing for the soil, whilst they consume nevertheless its produce.

Once more we must not be misunderstood. Manufacture and agriculture cannot be enemies under a reign of free competition; but their productiveness may be singularly changed in a social state in which the urban populations have remained longer protected than the agricultural population. Indeed, such is the primitive idea, resulting from the economic studies of M. de Lavergne. Centralization has so far ruled our situation in France, that almost all causes have combined to develope the riches of the cities rather than those of the country. Thus professional instruction occupies itself with recruitment of the army, with medicine, with the bar, with the arts and manufactures, rather than with that of agriculture. So again, the majority of the great families reside in the cities, where they find life more agreeable. And we are astonished that capital and labour desert the fields, when they have so high an example set them. We are astonished that the peasants, surrounded with lands which should be the best investments for rural savings, have become the holders of railway shares and debentures of French and foreign stocks !

O progress of the age ! Formerly, when the country notaries made out inventories of inheritance, what did they find in the house of the easy peasant ? Good closets furnished with good linen, and granaries well furnished with corn. What do they find now ? Papers and public deeds negociable at the Exchange. It is the fulfilment of the proverb, "Other times, other manners." It remains to be seen which manners are the best.

But what can be done to alter all this ? On this question M. de Lavergne shows himself faithful to all his economic antecedents; that is to say, that his advice is not of those who would upset all social order. He has interrogated the science of political economy. He knows on what conditions capitals are created and manufactures prosper. He has confidence also in the good sense of our rural populations, who, in times of great crises, have always known how to get us out of them. He hopes, too, that more than one prodigal son will return sooner or later to the village; for, after all, it is there that France will always reckon upon the most labourers, and, at need, the most soldiers.

On the other hand, it behoves us to prepare for this future. Agriculture will become what agriculturists themselves become: like as in all the social circles, high as well as low, these should be able to treat on a footing of equality with the representatives of other professions; and then not one measure of general interest will be taken without the agricultural interest receiving full satisfaction. All depends on that; it is necessary that agricultural France should be able to constantly enlighten the Government, for there are no more certain means of rendering it stable and powerful, to the profit of the country. Large culture and a large property, above all, have much to do, to march on an equality with the small proprietor and small culture. We may say that in this respect we are not in equilibrium as a nation.

If the number of cultivators were sufficient for success, or rather, to place the agricultural element into position amongst the other elements of national power, it is evident that French agriculture, the employment of twenty-five out of the thirty-five millions of inhabitants, would be in a position to make the rural spirit predominate in the public mind; and, with the rural spirit, all the principles of order and progress which it comports. But we are not deceived there. If the rural spirit exists in our country, let us admit, at least, that it is much more alive in the subdivided districts than in those of aggregated culture. It is not, therefore, surprising that it should experience ideas, manners, and aspirations of the intellectual level of the dominant population, of which it is the representative. This is why we find in it, in so high a degree, that love of family and property, and all those domestic virtues, which, in a word, are, without dispute, one of the most solid bases of our social order. But by way of retaliation, it is not amongst these laborious populations, almost constantly bowed down to the soil, that we must seek for those connected ideas, that knowledge of general interests, and that superior education which our modern society requires. Consequently it is no longer there that we must seek for that useful counterpois, which, amongst the English, places the defence of agricultural interests under the protection of men who can, know how to, and will, cultivate them.

It is, therefore, essential that we should not confound the rural spirit of large culture with that of small culture. The latter guarantees order in this respect, that small workmen have neither time nor even desire to employ themselves with anything but their harvests, cattle, sales, and purchases. The former, quite as strenuous for order, more particularly guarantee progress in this sense—that, sharing in the movements of general interest, it can give the impulse to public opinion, and does not conform itself to receiving the word of command. In a word, if there were in a state only small cultivators, the big-wigs of finance, manufacture, and commerce would easily gain the ascendancy; which would be a misfortune, for it would be the absolute reign of certain interests.

It will not be thus: science and capital come to the fields; and, thanks to these levers of progress, there is amongst our rural society a class of men who, without the rights of seniority, majorats, or estates in tail, will know how to prevent the excessive sub-division of the soil. To this class of men we may address the language of M. de Lavergne; for, precisely because it loves the truth and disdains false complacency, because it desires employment for the workmen and preaches by example, there are none, who better than they, have the right of not being suspected of a bad spirit, when they raise their voice in favour of useful reforms, and point out certain dangers to the citizens. M. de Lavergne has found an echo in this part of the population. It is, I think, an excellent proof that he has in his writings known how to unite moderation of language with firmness of opinion. Let us not, however, consider him exclusively as the advocate of large culture: that would be to forget all that he has justly said in favour of small culture, for which he professes, with truth, a very particular esteem. So also in what regards manufacture, it is unnecessary to suppose that he has placed it in antagonism with agriculture: far from it. A man of profound views, he has arrived through political economy at rural economy, through the whole to the part. That is to say, he is not exclusive, and loves all the branches of human labour. He has been, I repeat, struck with the depopulation of our country districts; he seeks by the light of science, and in the domain of individual energy rather than in the intervention of the State, a remedy for this public danger. In short, M. de Lavergne has made once more one of those good books, which displays to us all the grandeur and utility of the part that agriculture is called upon to play in France, and that to the advantage of our population, whom it behoves to preserve its rural character. E. Lecouteux,

Former Director of the Cultures of the
Agronomic Institute of Versailles.

THE LATEST PATENTS FOR PLOUGHING BY STEAM.

The next patent machine for tilling and preparing and, adapted to "steam traction," which we have to notice, is that of William Smith, of Little Woolstone, Bucks. (Patent dated September 7th, 1853. No. of patent, 2,121. Price of specification, 6½d.) The invention claimed in the patent is the manner of combining implements, such as the patentee has before used as subsoil ploughs, into one. The implement represented in the drawing is in general appearance like the cultivator or grubber. The tines, or "implements" as they are designated in the specification, are three in number. Of these, the central is the only one provided with handles; the frames or bodies of the other two are in all respects similar to this central implement. Two cross-beams (*a a*) are provided for combining the three into one. The fore parts of the beams or bodies of the implements are connected with a bar (*b*) which runs parallel to, and some distance before, the cross-beams (*a a*). At each end of the bar (*b*) a vertical screw, with an eye at its upper end, is placed; through the eyes of these rods the draft chains fixed to the stems of the cutting implements are passed, and extended forward and attached to the whippletree connected with the bar (*b*). The whippletree is inclined, as required, to either side, by chains attached to each end: these are taken up and hooked at points in the handle of the central implement, so as to be within reach of the attendant. Wheels are provided, one to each of the two outer implements; and in some cases, on stiff land, the patentee states that each implement has its own wheel. The height of the wheel and of the implements are adjusted in the frame in manner similar to the coulter and wheels of the plough. The tine, or cutting part of the implement, resembles in form the tine of the ordinary grubber or cultivator.

The patent next in chronological order which we propose to notice under the present division of our subject, is that granted to John Allen Williams, of Baydon, Wilts. (Patent dated 17th of June, 1854. No. of patent, 1,325. Price of specification, 1s. 6d.) This invention relates to an arrangement of plough or cultivating apparatus for working land, "Whereby," says the specification, "a much superior cultivating effect is obtainable than is possible with the common or other existing forms of ploughs or cultivators." The cultivating implements represented in the drawings attached to the specification resemble closely in arrangement and detail the ordinary plough, with its share, mouldboard, and coulter. The peculiar feature of the arrangement is the method by which various adjustments can be given to these ploughs: they can, for instance, be lifted vertically out of or adjusted to any distance from the soil in which they work, the ploughshares being attached to a series of horizontal bars (*a*) running from end to end of the framing of the machine; these bars being provided with eyes sliding up and down on vertical guide-bars (*b*) fitted to the back of the framing. Three of these plough bars or beams (*a*) are stated by the patentee to be a convenient number. To the front of the framing, vertical guides (*c*), corresponding to (*b*), are fitted: these are provided with block pieces (*d*) which slide up and down. To projecting rings or ears made on these block pieces (*d*) the extremities of the horizontal plough bars (*a*) are jointed, the ends of the plough bars being furnished with a double eye or fork. By this arrangement, if obstacles present themselves to the ploughs while in operation, the ploughs give way to the obstacles; the plough bars (*a*) rising behind, and turning on the jointed block pieces (*d*) sliding on the front guide bars (*c*), the plough bars, with their attached ploughs, are lifted simultaneously out of contact with, or adjusted to any distance from, the soil by the following means. At each end of the framing carrying the guide bars (*b c*) a set of loose pulleys (*e*) are hung; chains connected with the plough bars (*a*) at each end pass over these pulleys; the chains (*f*) attached to the ends of the plough bars at the back of the machine being at once connected to lever handles (*g*) placed within the reach of the attendant. The chains attached to the front end of the plough bars (*a*) pass over their corresponding pulleys, and are connected with rods or links which extend along the framing, and are connected at their opposite ends to the chains (*f*) connected with the lever handles (*g*). By depressing these handles (*g*) both ends of the plough bars are raised simultaneously. The lever handles (*g*) work in segmental slides provided with holes, through which pins pass, and are made to regulate the extent of "lift" of the plough bars (*a*). Each plough bar is also capable of being lifted up independently of the others, by means of a small handle fixed to the back end of the bar. The vertical guide bars (*c*) are capable of being slightly inclined, so as to give a corresponding lateral inclination to the coulters and turn-furrows of the ploughs, and to enable them "to turn the furrows more efficiently when ploughing a hill-side or sidelong ground." The lateral traverse of the frame which gives the inclination to the guide bars (*c*) above referred to, is effected through the medium of a handle situated at the back of the machine, within the reach of the attendant. This handle is fixed at the end of a rod reaching from one end of the machine to the other, and provided at the further extremity with a pinion working into a rack fitted on the hind bar of the sloping wrought-iron frame carrying the guide bars (*c*) working in slots attached to the main framing of the machine. The whole apparatus is supported in a long rectangular framing, of length corresponding to the number of ploughs employed. This framing is supported by two large wheels, running loose upon separate axles, placed at different levels to suit the depth of furrow to be made in the inequality of the surface over which the machine travels. A support for the framing is obtained at the back end by a smaller wheel set upon a swivel centre capable of lateral adjustment. In ploughing, the off-side front wheel runs in, and is steadied by the furrow cut by the previous traverse of the plough, whilst the corresponding wheel runs on the unploughed ground. This arrangement involves the necessity of having the near side-wheel higher by the depth of the furrow than the off side, this being attained by a nut and screw in a rack and pinion adjustment. The ploughshares or cutters are set one behind the other, as regards the direction of the plough's traverse; so that the off or right-hand plough begins to cut first, the second one next, and the near one last: the hind wheel, following immediately in the newly cut furrow on the near side of the plough, receives a guide from the last formed furrow.

Although not exactly in chronolgical order, we may here notice a second patent granted to Mr. Williams (date of patent Dec. 7, 1855; No. of patent 2,766; price of specification 9d.), for a ploughing or cultivating machine, the general arrangements of which closely resemble that which we have above described; the plough or cultivator bars being supported and adjusted by the same mechanism; the framing is, however, supported on a pair of small swivel wheels in front, and by a pair of larger wheels at the back of the machine. An important claim in the patent is for " a peculiar share." This consists of an ordinary plough share, with a left-hand pin formed in it. " A small turnfurrow of a peculiar construction is fitted to the plough body, and consists of a steel plate, fitted or formed with a knife or cutting edge, at right angles or thereabouts to its surface, working under the furrow, and severing the same, so that one portion of the furrow slice will be cut and laid over the other part, thus leaving an uneven surface for the harrow teeth, in the subsequent operation of harrowing, to lay hold of." The central beam is the longest, and has its cutting implement nearest to the front of the framing, which is angle or pointed, so as to suit the different lengths of the beam. By the arrangement adopted, the two implements on each side of the central beam come into operation successively. The pins of the shares are made broad enough to intersect each other's course; in this way the entire surface is operated on. A claim is also made in the patent for a combination of implements in one frame, to act as a rafter frame and a horse-hoe. The ploughs in the ordinary machine can also be taken out, and " drag" tines substituted.

The last patent machine or implement, coming under the present division of our subject, is that of Richard Coleman (patent dated May 28, 1855; No. 1,222; price of specification 1s. 10d.) The patent is for improvements in the construction of land rollers, and an implement for ploughing and breaking up, or scarifying the soil. That part of the patent which refers to the latter class of implements is for " a method of combining a series of ploughs in one machine, for turning up or otherwise tilling the land." Two, three, or more ploughs are mounted on a frame, in a position diagonal to their direction of motion, so that one acts in advance of the other, and breaks up and turns over a breadth of land equal to the number of ploughs employed. In the machine shown in the drawing four ploughs are employed. The ploughs are provided with parallel-faced stems, which slide in sockets, made in the main framing. This framing is supported in front by two swivel wheels, which are free to turn round on the vertical axis, supported by the front of the framing to the axle of the wheels. Near one end a rod is jointed; this is carried along the front of the framing, and jointed to the short arm of a hand lever, placed within reach of the attendant. By turning this handle the rod acts upon, and causes the axle of the wheels to move out of the line, so that the machine may be guided as desired. The centre of these wheels is also adjustable, so as to bring it nearer to or further from the ground, by a lever jointed to the upper end of the vertical one attached to the axle of the wheels. The framing is supported at the back by two large wheels, which are capable of adjustment, by means similar to that employed in the well-known "cultivator" of the patentee. The plough-frames are fitted to sockets in a second framing; this is placed above the main framing, and moves in vertical guides attached to the main framing, and also by rods sliding in vertical guides made in a bar or tie, which is placed across the lower framing. To the upper frame the coulters are suspended in the same way as the plough-frames; the upright stems of the coulters, as also of th plough, slide in sockets made in the lower framing. The upper frame, with its plough-frames and coulters, is elevated and depressed at will by an ingenious system of levers. A cross shaft (*a*), fitted with a lever handle, by which it can be turned on its bearings, is supported in bearings fitted to the main or lower frame; and carries at each extremity bell cranks or levers, with two arms, one of which is horizontal. These horizontal arms are connected by jointed rods to the middle of the upper framing carrying the plough-frames, while the other arms of the bell cranks are jointed to the lower arms of a second series of bell cranks. These second bell cranks are fitted to studs in the lower frame, the other arms of these bell cranks being connected to the upper frame by levers. The upper frame is thus entirely supported by jointed rods, connected with a series of bell cranks. By moving the lever on the cross shaft (*a*), the whole system of cranks and levers is operated upon, and the upper frame lowered or raised as required.

In a modification of this apparatus, also described in the specification, the upper moveable frame is dispensed with, and the plough-frames and coulters are raised by a rack-and-pinion motion.

THE ARTIFICIAL MANURE QUESTION.—At a meeting of the Oxford Farmers' Club, on Wednesday, Jan. 14, the following resolution, proposed by Mr. Mein, and seconded by Mr. Coggins, was carried unanimously: "That this Club considers the use of artificial manure is still too much limited; that Peruvian guano, as a standard, is the best top-dressing for corn crops; farm-yard manure, guano, nitrate of soda, and bone-dust for grass land; that mixed manures are the best for root crops; and that without a liberal use of artificial manure the present extent of land in this country could not be kept in cultivation, as there is nothing that has tended more to assist high farming than the introduction of artificial manure; and, finally, that this Club does not consider that the decay of the root crop is attributable to the lavish application of manures." At the same meeting, Mr. Thomson, of Colham, was re-elected Chairman of the Club for the ensuing year.

THE CAUSES OF THE DECLINE IN THE PRICE OF CORN.

The continued decline in prices of grain, but especially wheat, has begun to alarm the agriculturists, some of whom consider it the prelude to a permanent range of prices below what it can be produced at. There are, however, many causes operating at the present time to occasion this decline, which are not likely to continue; nor, some of them at least, to occur again; and to these we are about to direct the attention of our readers, with the view of relieving their minds from apprehensions which have little foundation in facts.

First. The wheat crop of 1857 was, beyond a doubt, above an average one, probably to the extent of one-fifth, taking the usual produce at 16,000,000 quarters. This would make the produce of the last harvest 19,500,000 quarters, or about one-and-a-half million quarters below the average consumption. A *very large* portion of the crop was thrashed out in the first four months of the season, so that although the American supplies of both wheat and flour were withheld during that period, there was an ample supply of native-grown wheat, and importations enough from the Baltic and other near ports of foreign wheat to supply any deficiency that would otherwise have arisen from the non arrival of the produce of the United States.

Another minor cause is the state of the potato crop, which on account of the prevalence of the disease, and doubt of their keeping good in store, have been brought to market freely, and as largely consumed by the small growers instead of bread. This has materially affected the consumption of the latter article since harvest; but as the potatoes are rapidly being used up, the working classes will soon have recourse to bread again as the only farinacious food, and now cheaper than potatoes.

Thirdly, the state of the money market, which has affected every other market in the kingdom, especially that of corn, not only as having diminished consumption by throwing a vast number of hands out of work, and thus reducing their means for procuring food, but also by inducing the millers and dealers to contract their purchases to their immediate requirements, and thus checking whatever disposition might otherwise have existed to retain stocks of wheat and flour.

Fourthly, the rescinding of the French decrees against the exportation of grain. We have left this to the last, not because of its unimportance, but because it demands a fuller explanation than any other question connected with the subject. That the late decree has had a material and very natural effect upon the price of wheat and flour is evident, from the course prices have taken from the very day it was promulged on the corn market; and *that* effect is easily accounted for. If *any* produce market is amply supplied, a small excess in permanent operation will tend to lower prices, as a small permanent deficiency will have the contrary effect. Now, the quantity of French wheat and flour imported, and in process of being imported, into the United Kingdom, is trifling compared with the consumption, but it is *in excess of the demand*, and consequently takes the place of so much native wheat, also being *fresh* and of good quality. Whether the French will be able to continue exporting even to the present small extent is a question that remains to be solved. Certain it is, however, that their own production and consumption will not leave room for such an export trade as to make up to us the loss of the American supply; and, if we may judge of the future by the past, we should say that even *this season* they cannot continue to export, without leaving themselves bare of wheat. The following statement will bear us out in this opinion.

By a reference to the French official returns of exports and imports of grain for the last twenty-five years, we find the quantity of wheat, reduced to English measure, to have been respectively as follows:—

	qrs.		qrs.	
Imports....	18,485,387	or	739,415	per annum.
Exports....	10,564,913		422,996	,,
Excess of imports	7,920,474		316,419	

The whole of these statistics are a bagatelle compared with those of the United Kingdom; but they are important to us, as proving that, at present at least, France cannot grow wheat permanently for exportation. Even if we take the last eleven years, which are considered by the French writers on the subject to have been seasons of great agricultural prosperity, we find the excess of imports to average still more than for the above twenty-five years, being 337,764 qrs. per annum. Either, therefore, the quantity grown is smaller, by a contraction of the area of cultivation, or the consumption of wheaten bread has increased in France. We believe that the former has been the case, for the following reasons.

First, the continual subdivision of the land under the present law of inheritance, has a manifest tendency to withdraw cultivation from cereals, and multiply the kinds of produce. This is, by some of the French economists, considered the glory of the system, as affording subsistence to a much larger population. But, on the other hand, the most far-seeing men in that country deprecate the system as forming a direct barrier to all agricultural as well as social improvement, whilst it keeps the whole agricultural population in a normal state of poverty incompatible with the well-being of the state. A proof of this may be found in the statistics of the population, which in five years, from 1851 to 1856, has increased only to the extent of 256,194, or rather less than three quarters per cent. But the most remarkable feature in the census is, that whilst the whole of France has increased only 256,194, the population of Paris has increased 305,354; from which it is evident that in the agricultural districts the population is rapidly decreasing,* Paris being only the type, in regard to population, of the other large cities of France; and the same process is going on in all the rural districts. It appears also, by the accounts of well-informed men, that it is not the very poorest of the rural population that are thus fleeing from their native villages, but the most intelligent and well-to-do of the peasantry and mechanics of all kinds. Nor is it from the increase of agricultural machinery that these men are driven to emigrate, for improvements of all kinds find enormous difficulties in penetrating into the interior of France. Nor are the French peasantry as a body able, in a pecuniary point of view, to adopt such improvements, or any measures for the amelioration of the soil or increase of their produce. In this respect they are in a normal state, from which they can never be galvanized by the Government; and nothing less than a complete alteration of the law of inheritance will produce that change.

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* **See the article on Agriculture and Population in another column.**

Under present circumstances, therefore, the English has nothing to fear from the competition of the French farmer. Both countries were blessed last season with a productive harvest, and low prices are the consequence, aggravated by other and temporary circumstances, which can hardly occur again in a simultaneous combination.

It is a great alleviation to the present state of the corn-trade that meat and all animal produce continue at remunerating prices. In this, neither France nor any other country can injure us. It is true, by the system pursued by the French Government in its interference with the several trades, and the butchers amongst the rest, the retail price of meat is kept down to a certain standard, like that of bread; but the consequent increased consumption has raised the price *to the butcher* beyond what would pay a profit upon an export-trade to England; so that our graziers have the market pretty well to themselves. We much question also whether, with our improved system of agriculture and the use of machinery, we cannot compete with any corn-growing country in the world, when the expences of transit, commission, &c., are taken into the account.

USES OF THE SNOW.

Pleasant as is the revolution of the seasons, with the manifold aspects they present, one can hardly observe the approach of winter without feelings of regret and sadness. This is the case especially with those who delight in the observation and study of Nature, or are devoted to the pursuits of agriculture. The tourist finds little pleasure in excursions amid beautiful scenery, if meanwhile he is frost-bitten; the landscape painter must fold up his sketches with benumbed fingers, and hasten homeward; the botanist—where are the flowers he loved so well?—the geologist, entomologist, and indeed the student in almost every department in natural science, finds his sphere of observation reduced to very narrow bounds; the gardener must cease his delightful labours, and the farmer can no longer sow and reap, and gather into barns, but must witness for many months an exhausting drain upon his stores without any replenishing streams.

But is there no bright side to this picture? While our gardens and fields are buried in snow, and our roads are blocked up by drifts, are there no benefits in this winter covering which make up a partial compensation for its admitted evils and discomforts? We think there are; and such as most concern the man (the farmer) who seems most to suffer from it. It is this aspect of winter we now propose briefly to consider.

The old proverb that "snow is the poor man's manure," is believed to have its basis in scientific fact. Chemists tell us that analysis reveals a larger per-centage of ammonia in snow than in rain. This, at least, is true, that snow is a powerful absorbent, purifying the air, and returning those impurities as fertilisers to the soil. Melt in a clean vessel a mass of snow which has lain a short time on the ground, and the taste will detect foreign elements in the water. This is most manifest in the neghbourhood of large towns. The harshness and dryness produced in the mouth by drinking snow water, and the unpleasant effects on the skin by washing in it, are ascribed to the impurities it contains. The disease called *goitre*, prevailing in Alpine regions, is also attributed by some to the use of snow water. A certain writer illustrates the absorbent power of snow thus: "Take a lump of snow (crust answers well), of three or four inches in length, and hold it in the flame of a lamp; not a drop of water will fall from the snow, but the water as fast as formed will penetrate or be drawn up into the snow by capillary attraction. It is by virtue of this power that it purifies the atmosphere, by absorbing and retaining its noxious and noisome gases and odours."

Furthermore, it prevents exhalations from the earth, and having absorbed them, returns their fertilising properties to the soil. Hence, marshes and stagnant pools become inodorous in winter, and the unwholesome effluvia of vegetable matter everywhere decaying, is retained, and with the melting of the snow in spring, is taken up by the soil. So much as this, at least, we fully believe—that "the poor man's manure" is as good as some of the "patent" fertilizers of the day.

Snow helps the springs and mill-streams in winter. Were the ground naked from fall to spring, and frozen meanwhile several feet deep, the springs would give out, and water-wheels of all descriptions stand idle. As it is, however, the snow prevents the frost from penetrating to a great depth—especially in the wooded hills, the fountain heads of springs and streams—and by their gradual melting keep up a supply of water for man and beast.

Not the least important use of snow is the protection it affords to tender vegetation. Even in northern latitudes, there is a multitude of tender and half-tender indigenous plants, which require more or less protection in winter. Nature provides for them most wisely. She hangs over them the branches of neighbouring trees and bushes, gathers about their roots a many-folded blanket of dry leaves, and last of all, spreads over them a fleecy mantle of snow. With this covering they pass through the severest winter safely; but were they transplanted to exposed situations, they would die at once. But besides, our gardens and fields are stocked with plants and grains which are the natives of warmer climates, and need protection still more. Sweep off the snow from our wheat fields and meadows, and at least a portion of the crop would be winter-killed. Some of the choicest herbaceous plants in our gardens, brought from milder regions, will pass unharmed through our coldest winters, if only they are covered with snow. So of many tender shrubs. With their branches fastened to the ground so as to be covered with snow, they hybernate in Canada about as well as at the tropics. We have seen the English yew, several feet high, come out in spring well browned above the snow-line, while all below was green as emerald. The Japan quince, by no means a tender shrub, the deutzias, *Spirea prunifolia*, *Forsythia viridissima*, the scarlet-flowering currants, &c., &c., frequently lose their flower-buds, if not their branches, above the snow, while all underneath is unharmed. The buds of peach-trees are often killed in severe winters; but if a few branches happen to get bent under the snow, they produce a splendid show of fruit. Scientific travellers in Siberia have recorded instances in which, with the temperature of the air above the snow at 72 degs. below zero, that below was 29 degs. above zero, showing a difference of 100 degs. Dr. Kane, in his "Arctic Expedition," mentions finding underneath the snow, at lat. 78 degs., "the andromeda in full flower, and saxifrages and carices green under the dried tufts of last year. Here, too, the silene and cerathrium, as well as the characteristic flower-growths of later summer, the poppy and sorrel, were already recognizable." * * * "Few of us at home," he continues, "can realise the protecting value of this warm coverlet of snow. No eider-down in the cradle of an infant is tucked in more kindly than the sleeping dress of winter about this feeble flower-life."

When the snow falls early in winter, and remains until spring, the ground is seldom frozen at all. And if it becomes frozen a few inches deep before the snow falls, the heat of the subsoil thaws out the frost above it, and the superincumbent snow prevents another freezing, so that in early spring the ground is soft and ready for the plough and spade.

The aid which the snow renders the farmers in clearing up swamps and getting out muck in winter, and in hauling wood and lumber to market; the peculiar brilliancy of the snowy landscape when lighted up by the sun; the sport of sliding down hill for the boys, and of sleigh-riding for children of larger growth, are considerations not to be omitted in numbering up the uses of snow.—Country Gentleman.

ON TRUNK-DRAINING.

A trunk is the body without the head and limbs, the main stem without branches and ramifications. It is the chief part of an organized growth, the foundation of an artificial structure, and the base of any operations: it forms the support on which any structure rests, from which it receives the formation, the existence, and its value. The trunk is the largest member of any production, and the body of any congregation of parts: the use of it receives the adhesion of other parts, and renders to them its own assistance.

By trunk-draining are understood the water courses that receive and convey the discharges of water from the small drains, which intersect and ramify any entire superfices of ground, and under the general designation are comprehended rivers, brooks, rivulets, artificial open cuts, and the large covered drains that are placed along the lower end of fields and lands for the purpose of carrying the water from the under drains. These conveyances perform the same offices with the body of a man, and the trunk of a tree: they communicate with the branches, and uphold the existence by administering support and relief. The functional parts of organized bodies would be surcharged and suffocated with excrements and exudations if the vent by the trunk was not provided to relieve the superfluities that are cast off. The voidances find an egress by which to discharge the dregs of the process of elaboration. The small drains, of the branches of the performance, collect the water from the land, and find by the trunk an exit by which the water is relieved, and their function progresses without stop or interruption. The connection of the small drains with the trunk must be intimate and free in the action. The latter must be ready and sufficient to receive and convey the discharge of the small drains, in order that the utility be not impeded, nor the operation disturbed. Nature has shown the essential purpose of a trunk, or principal stem in all its organized productions; the bole of the tree supports the ramifications and the foliage; the stem of the herb upholds the stalks of the leaves, and the fruit, and the universal provision in all cases exhibits a base or support for every composite erection. The inorganic world is similarly composed: the river receives and conveys the waters of the smaller streams, and discharges the whole contents into the general reservoir of the sea; the rivulets receive the washings of the surface of the ground, and the harder materials of the globe are seen to uphold the softer, not only as a base on which to rest, but as a source from which to draw the reservation and increase of the composition. Without a trunk, main support, or principal stem, no production or operation can be legitimately entertained or executed.

A river being the discharge of collected waters into the general reservoir of the sea, is the trunk which relieves all the subordinate agents of the burden incurred by the discharge of the functions of office. The bed of rivers is naturally in low grounds in which the waters have scooped a channel that is very considerably lower than the surrounding surfaces. The fall towards the sea of all countries affords a descent for the waters, that is more or less rapid according to the declivity of the surface, and the obstacles that are encountered. In most cases, the descent of rivers constitutes a conveying trunk for the collected waters that effectually relieves the smaller collections, and affords a ready outlet to the contributions. Low grounds and alluvial flats are the only occurrences which may be insufficiently accommodated by the trunk of the river as a conveying channel for the collected waters of the surface of the ground; heavy falls of rain will flood the river, and cause an overflow of the water above the banks, and over the adjoining grounds; during which time the discharge will be stopped of the conductors of water into the river. To keep the river within the banks, and prevent the overflow of water on the lands, grassy mounds of earth are raised along the course of the river, in a line back from the water's edge, so as to allow ample room for the increase of flooded waters without unduly confining the stream to compel a violent breach of the embankment. During the time of low waters the descent will be sufficient for the escape of the waters that are discharged: during floods the escape will be stopped, and a reflux of the waters will stagnate into any opening or hollow that can be found. It is this effect that has to be guarded against on low grounds over which the waters flow, and in several cases the difficulty is not small of remedying the evil. A floodgate may be placed in the opening of the embankment, through which the water is discharged into the river, which will be shut by the outside pressure of the swollen river, and hinder the reflux of any water behind the embankment. But the usual discharge of water will be prohibited from making its escape, and will stagnate and overflow if it has not room for expansion. This stagnation, by flowing backwards, will hinder the usual discharges of the smaller contributions, impede the action, and inflict damage, until the decrease of the swollen rivers, by lessening the outside pressure on the flood-gate, enables the water collected in the inside to force it open, and find a discharge. This plan is sometimes the only adoption that can be used, circumstances prohibiting other recourse; and the attendant evils must be borne. The collections of water that join the flat course of the river should be led into it at the sharpest possible angle of divergence, so that, when it joins the chief current, no backward pressure is felt, but a willing reception is found into the general movement in one and the same direction. In many cases this direction may be impossible; but, whenever in any way to be attained, the advantages of it are very large. During the time the river is flooded, the damage done by the water itself would not be of much moment; but earthy solutions are held in suspension by the collected waters of the country, and, being stagnated and introduced backwards into the smaller drains, a sediment is deposited which the weak discharge from the small drains is unable to remove, and it becomes firm ground, and fills up the drain. It is even forced upwards among the filling materials of the drains, leaves an earthy residuum, which remains and impedes the reception of the surface-water. The largest open cuts cannot prevent this consequence, as the extent of capacity will be overpowered by the body of waters. Much ground will also be occupied by many of these excavations, which should be confined to one main leading cut that remains uncovered. The conveying direction of this cut along the stream of the river, and joining it at a very sharp angle, will best serve the purpose, if at all available. Flood-gates are liable to the heavy objection of congregated waters inside the embankments, which remain during the time of the floods, and inflict damage. When a very slanting direction is effected, the backward power of the water in the river is almost none: it continues in being lost at every step from the right angle to the point of no angle at all, when it entirely ceases. This method must be used in every possible case of adoption, and will prove more generally useful than flood-gates, for the reasons that have been given.

The alluvial flat which the river traverses will often be bounded by high lands on both sides, that have a hollow ground along the base, and which is often low as the river, or below its level. This situation is often very appropriate for an open cut, into which much water will flow, from the high ground on one side, and from the flat space between it and the river. In the case of a small drainage, the discharge of the ramifications will open into this cut, which will run a parallel course with the river, and join the current at a sharp corner, when the river inclines to that side of the valley, and impinges against the high grounds. A flood of the river will stop the current of water in this cut; but the extent of it being capacious, and the flowing of it along with the rivers, will make the damage less formidable than in any other way, as the depth of bottom will be considerably below the level of the small drains. At all events, the backward force will be less than in any other arrangement.

The descent of rivers is often much accelerated, and the discharge of water increased, by cutting off the corners of its course, straightening the line, and thus lowering the level of the water. Where a straight line cannot be got, the rounding of corners will receive the conflict of waters with the obstacles of its course, put the eddying mass into motion, and increase the onward progress. Jetties of stone-work will be required at the sharpest turnings, which being placed to receive the current of water at a sharp angle of incidence, will throw it off at a similar angle, and direct it into the mid-stream of the channel, when it will move quicker from the agitation. Very sluggish movements of water in alluvial flats may be accelerated in this way, the level deepened, and a conveying-trunk obtained for the small drains.

The other case of rivers affording an insufficient trunk for the discharge of waters collected from small drains occurs on extensive lowlands, fens, and marshes, through which the streams meander in a devious course in search of the sea, and having little or no onward fall, and the bed raised by the sedimented mud, to or above the level of the surrounding grounds. Embankments are in this case the very first resort, with openings through which may pass the tributary streams that flow from the country on both sides of the river. When these minor streams are of considerable size embankments must confine these waters also, and conduct into the main river. The streams being joined, the same level of waters will be preserved, and the same flow of current will prevail. These collections of water afford a very bad trunk for the purpose of draining; but modern discoveries have tended wholly to remove the evil. Slanting courses are to be adopted, as has been mentioned, and every outlet sought at which a stream can be introduced into the main current. When no outward passage can be found the water collected into the open cut from the small drains is led by the same conductor to the lowest corner of the ground, and immediately behind the embankment a deep pond is formed, from which the water is raised by the pump of a steam-engine, and thrown into spouts, which convey it over the bank into the river, from whence there is no return. By this means the collected waters are reduced to the lowest level, and no overflow or stagnation ever happens. The mighty power of steam has in this case overcome all perplexities, and has reduced into a nutshell the trunk draining of the low lands that are below the level of descent. It is certainly the extreme application, when all other propositions fail, or are seen to be impossible; and it had better be at first adopted, than after a large expenditure has failed to reach the object. It is a sure agent and an effectual operation in every case of its power,

Brooks are a trunk of the same kind as rivers, receiving and conveying waters that have been collected by the smaller currents. In order to favour the quick passage of the water the courses will, in many cases, require to be deepened and straightened—especially the last—and also widened, where the quantity of the collected waters is found to be too large for the room that is contained within the banks. The natural channels that have been excavated at random will be insufficient to answer the modern purposes of drainage; widening will be the best alteration, and always with a depth below the bottom level of the small drains. When the quantity of water is the largest in the brook its top level should be below the drains, or, at least, not impede the discharge. Allowing waters a wide extent of course is much better than deepening the bed: expansion of the volume diminishes the depth and, correspondingly, its force, and being spread in width below the level of the drains, no stoppage can happen from the water rising to the orifices. A wide water-course of medium depth forms the best trunk for draining—the depth has little impinging force against the banks, and any swell of the water is lost in the width of the course. The bed is hollowed in the middle, where the ordinary current may flow, to prevent the wandering of the water from bank to bank, and alternately impinging against and tearing the confines of its course. A depth in the centre and a sloping shallowness on the sides and below the banks, on which the flood can spread and roll along, constitutes the most eligible course for all small streams, as brooks and rivulets, always allotting the extent of the bed to the quantity of water that has been found to prevail at all times and occasions. Circumstances may not allow this adoption in the full extent, but the performances of the kind may be made to tend in that direction. The bottom level of the small drains may be on the top of the slope of the side of the course, which the highest flood may never reach, and the opening of the drains never exposed to damage. Gentle elevations of surface will readliy allow this arrangement which may be used in many modifications.

The improvement of brooks, as trunks for draining, is done as for rivers, when the courses run through flat ponds and level countries. The means must be adopted of widening, deepening, and cutting straight the courses and rounding the corners, by which to accelerate the discharge of the water, and quickly relieve the small drains of the contents. The top level of the water in the brook must be below the bottom level of the small drains, so that the discharge of the latter is always to be seen, and the highest flood of the brook must not exclude the view, except for a short time. The ultimate efficacy of brooks as a trunk drain depends upon the main river, of which it is a tributary, at least in the near approaches of its course to the bed of the river. Here the ground is generally flat, and the course of the water may become sluggish, and rise to the small drains, when the object becomes apparent of having the river's course sufficient to receive and convey the additional bulk that comes to be admitted. The brook is a river in miniature, and must be adapted by the means that have been mentioned to receive and convey the discharge of the smaller drains in the like manner that the river has been altered and improved in its course, to admit and carry away the contents of the brooks and smaller streams of water: the river is the chief trunk, and upon it all the ramifications depend.

Rivulets are currents that are inferior to brooks in the quantity of water, and in summer many of these streams are wholly dry or reduced to an amount that scarcely forms a current of any kind. When the bed of a rivulet constitutes much the most eligible trunk to receive the small drainage of contiguous wet grounds, the natural depth may be too shallow to receive the water from the bottom level of the small drains; in that case a wholly new channel will be cut, following the old course in all proper directions, and traversing new ground in order to find a preferable situation for the intended purpose. This performance will be often much more eligible than repairing an old course into an imperfect channel, by reason of an originally wrong direction in the natural current of the water. A straight or moderately-curved line of course will thus be procured in many cases, where the old channel will not afford a more efficient performance in every respect. Rivulets are seldom sufficient by the natural formation to receive the contents of drainage—the depth is too shallow, and the course too much blended and tortuous to evacuate the small drains, and afford a quick and ready passage of the water from the places of collection. New cuts must be made to suit the surface of the ground, and the intended purpose of access from the small drains, when a much more advantageous course will be obtained, and a double purpose effected.

Watercourses will most frequently show the position of trunks for the conveyance of water, which seeks the lowest grounds in which to flow, and which must be used for a similar purpose. New cuts will chiefly deviate from the old channel in passing through the corners and angles of the bended course, lessening distances and producing straight lines—the same ground will be traversed, and the same point reached at last. When rivulets are flowing streams during the whole year, with a considerable quantity of water, and the course meanders over a flat alluvial country, the management is the same as of brooks, as the terms are nearly synonymous. A near following of the old course is to be preferred in opening a larger passage for water along a hollow ground: the surface water naturally falls into it, and the lowest position is generally marked by the natural search of the water when left to its own performance. In draining the new cut, the essential must never be omitted that the course runs in the lowest position, and on no account must leave this most proper and indispensable place. Whatever line the course may exhibit, straight, bended, tortuous, or curved, this position must be strictly preserved: the discharge from the small drains will reach the trunk with every facility, encounter no obstacle, but have an uninterrupted descent from the extreme first end of the formation, into the last conveyance that relieves the current, and finishes the purpose.

Here this rule admits no exception, of placing trunk-drains, or conveyances of water, in the lowest positions of the ground. Water must be ever descending, and never stagnate, and far less be directed to the smallest acclivity, as when the trunk-drain leaves the lowest position. In draining of every kind, there must be a drain in every lowest position; and the rule is equally unexceptionable in the smallest case, on the varied and undulated surface of ground, as with the trunks that convey to the rivers the discharges of water from the small drains of the field.

ARTIFICIAL OPEN CUTS

Are made to answer the purpose of brooks and rivulets, to receive the water from the small drains, and convey it so a trunk or general conductor. A river traverses a country, and receives the water of many districts; brooks and rivulets pass through landed estates, and act as trunks for several farms; while artificial open cuts serve the purpose only on one farm, and for several divisions of land, and probably only for one field. The proper position is in the hollow places to which the water runs and flows over the surface during floods, and where no natural bed has been made by the water. In these places, the first performance is to excavate a cut of extent sufficient to receive and convey the water that will be directed into it by the small drains, and with a fall, to induce the regular descent. The cut may receive water on both sides of its course from the sloping grounds, when it will constitute a trunk of the proper kind. The width will be settled by the quantity of water that demands a passage; and the depth must not be under four feet of vertical height. This depth will receive the water of the small drains from the bottom, and permit a constant current in the cut, without stopping the orifices of discharge. This open cut sometimes constitutes the boundary or division of fields of land, when the size will be made sufficient for that purpose, and have the necessary fall to discharge the water. This excavation is an artificial brook or rivulet, and must be made on the plan that has been previously described. Large quantities of quickly-flowing water will tear the banks of soft alluvial earth, which must be guarded by rows of stakes driven into the ground, and backed with large stones, laid among gravels or coarse earths. Rapid descents of water will hollow the bottom and undermine the banks, when the bed must be pitched with stones flat in shape, or edged as curbs. This consequence shows the necessity of making the channels rather wide than deep, allowing the water room to spread, and thus destroying the power of its force. When a heavy current impinges against a bank on either side of the cut, the stream must be directed into the mid-channel, and guarded to flow in it.

Artificial cuts being destined to remain as trunks for conveying water, and in many cases to be the boundaries of divided fields of land, the excavation must be done on permanent grounds, by which to drain the adjoining lands, and effect the purpose of a dividing fence. The banks will be guarded by hedges of thorns or by a paling-fence on each side, and so far from the bank as not to be sunk by any slip that may happen. In other cases, the banks will be wholly open and unprotected, when the cut will form the fence, and must be deep and wide for the purpose. The banks are gently sloped, according to the nature of the soil, and best when the small drains are on a level with the highest flood that has been known.

LARGE COVERED DRAINS

along the lower ends of fields and lands are placed for the purpose of receiving and conveying the water from the under-drains. The most general position is along the inside of the fence, and as near to it as the foundation will allow; the excavations are covered on the very just principle that no open drains remain within the fences of a cultivated field of land. Open side-drains cause a loss of ground, an awkward ploughing of the headlands, and prevent the animals that graze the field from getting close to the fence for shelter, which in cold climates is a matter of considerable attention. The depth must be 3½ feet or 4 feet of vertical height, 3 feet wide at top, and 2½ feet wide at bottom. The small drains will run into it at a right angle or some smaller incidence, and the water must flow into a body of materials in the larger drain that are open to receive it. Where stones can be got, the best provision is a culvert of about a foot square, built with sides and cover of durable workmanship. The depth of one foot of broken stones is laid over the culvert, an inverted grassy turf covers the stones, and the loose earth is levelled to the top of the ground. In alluvial countries, where tiles are used for the purpose of draining, the culvert is formed by placing two longitudinal rows of large tiles made for the purpose, which are covered by the usual fillings of the drains. A large tile is turned to receive each small drain, and with stones an opening is left in the side wall to receive the water from the small tributary drains, which fall a few inches of declivity from their own bottom to the large drain. This declivity ensures a free discharge from the small drains, so that no stoppage can happen.

Few fields of drained land will discharge more water than can be contained in a square culvert of one foot, and when the large drain has a fall to keep the water running, which is done by a very small declivity. The covered drain will discharge the water into a brook or rivulet, of which the depth must freely receive the water that comes to be admitted, which must not rise above the top of the culvert of stones or of large tiles. Each trunk drain that receives water must be fitted for the purpose of receiving the contents of the smaller provisions of draining. The whole systematic value depends upon this aptitude being adjusted and continuously upheld. Any breach destroys the connection, and makes a hurtful disruption. In every case a declining level must be got and maintained throughout. The damage ceases when water is delivered into a channel into which no small drains are discharged; the course may then be more interrupted, and the waters move more slowly; but where a general drainage occurs, every point must be free and uninterrupted.

In many cases the water from the small drains, after escaping from the orifices, will traverse, before reaching the river, all the intermediate trunks that have been mentioned—brooks or rivulets, open cuts, and covered drains. The last-mentioned conductor will convey the water from the field where it is collected by the under-drains, and discharge it into an open cut or brook, which may immediately receive an adjacent small drainage into its current. The formation must be capable not only of receiving a collected stream of water, and conveying it along, but of reducing the top of the current below the level of the adjacent small drainage, to admit the contents freely and without impediment. It is best that all small drainage of waters be collected by a covered drain or open cut, and discharged by one mouth into a brook or rivulet. The covered drain being firmly erected no derangement can happen, and there is only one orifice to be attended. This mouth of discharge must have a very free outlet; and if it joins the receiving current on a level, the direction must be turned to the line of the main stream, and join it at a sharp angle. In this way the currents are joined in the flowing of the waters, and no pressure is exerted which can stop the continuation of the moving fluid. When a brook receives the contents of small drains throughout the whole course from the mouth of covered drains to the passage into the main river, the importance is most evident that the trunk affords a ready acceptance and uninterrupted conveyance to the collected burdens, which must not be allowed to stagnate or lose the onward progress. When the upper portion of a brook in its course is a receiving trunk, and the lower part a conveyance of water, the passage of the fluid will be less regarded in the latter part; the stream may be deeper, and the movement slower and more sluggish. A depth of water will not stop any discharge of small drains, and therefore the course may be less regarded; but in the upper part, where the special purpose consists in the trunk receiving and conveying water from the under-drainage of wet lands, a most vigilant attention must be exercised to keep the current of water in constant motion, and the highest level below the bottom of the drains, in order that a free discharge be secured to every orifice of water. This chief point is ever to be pushed forward for attention.

The drainer who knows his business, on having determined the line of the small drains of any ground to be perforated by cavities below the surface, will seek the lowest point or points to which the collected waters will fall, and look for the outlet by which the discharge must issue. Having found this point, the examination will proceed along the rivulet or brook, and ascertain the efficiency of these trunks to receive and convey the water; if insufficient, the beds must be improved as before directed; and if the course be distant from the point of the collected waters, an artificial open cut must be made, to act as a connecting trunk. When a cut or brook, or any secondary channel or water, reaches another property of land, and finds insufficient outlet, that property must provide a proper discharge for the current, and transmit the water that comes for admittance. Water is a burden that must be received from higher grounds by the lower situations, and conveyed over the extent of the latter, not only without injury to itself, but also to inflict no damage on the property from which it descends. Every landed estate incurs this responsibility.

Having reached the main outlet by which the collected waters descend from the small drains to the river or chief conveying trunk, the examination proceeds along the rivulet or brook, observes every defect, and suggests the remedy by marking every proper position. When the river is reached, beyond which no inspection is required, the level of that receiving trunk is accurately taken; and if the backlying country is flat, the spirit level is applied to denote the rise of every progress from the river, in order to ascertain the descent that can be obtained. In this way the descent is traced to the mouth of the covered drain which discharges the collected waters of the under-drainage, and the cutting of each excavation accurately determined along the whole course. The downward progress from the highest-drained lands to the lowest receiving trunk observes and inspects the courses of water as they are presented to view, and satisfies the inquiry of necessary outlets. The retracing of the steps adjusts every connection of the streams, and puts the whole arrangement into working order.

It is advantageous that the trunk drainings that have been mentioned are done for a time previous to the execution of the small drainage that must discharge the collected waters into the channels of conveyance. In all situations where the fall that can be got does not amount to a descent of running water, but barely moving or slightly removed from stagnation, the previous performance of the trunk drains will afford an inspection of the sufficiency of the executions for the intended purposes. If the regular descent is anywhere interrupted, and a stoppage is perceived, the whole line of conveyance must be again very accurately surveyed, and the levels ascertained, by what means and in what places the remedy is to be applied, in order to remove the deficiency that exists, and to promote the intended object. Deepening of the beds of water-courses can only be done in summer, when the quantity of water is small and the channel nearly bare; hence the intervention of one summer at least is necessary in such cases, that an opportunity may be given of deepening the bed of any brook, rivulet, or open cut that has been seen to be too shallow during the floods of winter. At least one year should elapse from the execution of trunk drains to the performance of small drainage; and both purposes being done in summer, a winter will intervene to show the capability of the conducting channels, and the rectification can be performed during the summer of the small draining. An elevated ground of under-drains may not be any way affected by the non-efficiency of the trunk or trunks; the stoppage may not reach the height of the situation, nor be large to inflict damage anywhere. But in many situations of several fields of small drainage delivering the contents into open cuts, rivulets, brooks, and even into rivers, the least degree of insufficiency in the trunks of conveyance will rise into damage. In these places a small fault may cause a large damage, and spread a wide devastation; in higher situations a large deficiency may do little hurt, or none at all, by reason of the circumstances of the position. But in every case of high or low grounds, of flat or elevated positions; the immediate receiving trunk of the small drains must be in the top level of its water, below the bottom of the ramifications, in order to convey away freely the discharged contents. If the current does not flow from the orifices in a purling stream, any stagnation must not rise to cause a reflux into the small drains. This is the chief accident to be prevented, and it forms the main purpose of trunk drains. The attention paid to it is equal to the care of small drainage, and it must precede any operation of the latter kind. The object is twofold—the collected water is received and carried away, and stagnations are removed.

FORMATION OF AN AGRICULTURAL ASSOCIATION IN ESSEX.

A meeting of the committee appointed on the 18th of December to consider the best means of applying the £336—part of the surplus subscription for the Royal Agricultural Society's Meeting in 1856—to the advancement of the agriculture of the county, was recently held at the Shire Hall, Chelmsford. C. Du Cane, Esq., M.P., presided; and there were present—W. M. Tuffnell, Esq., Colonel Brise, W. F. Hobbs, Esq., Mr. J. Clayden, E. Round, Esq., J. W. P. Watlington, Esq., J. O. Parker, Esq., J. S. Thompson, Esq.; Messrs. Christy, R. Baker, K. Viall, Burrell, Page, &c.

The Chairman having read a letter from Sir John Tyrell, in reply to an invitation to attend, and another from Mr. Gurdon Rebow, expressing their approbation of the proposal to establish a county society, said he thought it would be unnecessary for him to make any lengthened introductory remarks on the object for which they were assembled, as they must be all aware that in consequence of the liberal response made by the county of Essex in aid of the great meeting of 1856, a surplus fund of £540 remained. At a meeting of the general committee held on the 18th of December last, it was resolved, after some discussion, "that the surplus funds, &c., after applying £200 for the erection of a pedestal for the Sebastopol gun, in the High Street of Chelmsford, be devoted for the advancement of agriculture, and that a committee be formed for carrying it into effect." It was also resolved that a number of gentlemen named should be a committee for carrying out that object. As chairman of that committee, up to the commencement of the present meeting, he had power to make additions to it, and accordingly he had added the names of Mr. T. Kemble, Mr. T. B. Western, Mr. Cornell, Mr. Mechi, and Mr. Perry Watlington. Now they were assembled here again to day, to discuss and decide upon the application of the surplus of £336 to agricultural purposes; and if he for a moment thought there was likely to be any difference of opinion as to the method of applying it, he might be inclined to leave the suggestive part of the business to others, and sit down; but as he was in hopes they would all be unanimous, and believing that all their thoughts ran in the same channel, he ventured to take the initiative, and to state at once that he thought the possession of this sum, contributed for an agricultural purpose, presented them with an excellent opportunity for the institution of that which was a desideratum in the county—an agricultural association (Hear.) Considering the size and importance of the county, the high rank it held amongst the agricultural counties of England, the great names to be found amongst its agricultural men, he might say renowned throughout England for agricultural and practical skill, he thought an association of this kind could not fail to be a great boon to the county at large. Of course it would not be his province to enter into the details of such an association. These would be matters for serious consideration on subsequent occasions. But perhaps he might state the kind of association he had in his mind's eye. It was founded on the model of those he saw established and working successfully in Suffolk and Norfolk, meeting once a-year for the distribution of prizes for agricultural stock and implements, and such other branches of agriculture as might be determined on by the committee. He also thought there was another point which would be material—that was, that the annual meetings should itinerate to the different towns in the county, such towns being selected as might be hereafter named by the committee. He was aware that objections might possibly be urged to the course he recommended them to adopt. It might be urged that the experiment had been tried, and had failed; that not long since there was an agricultural society in this neighbourhood, which, after dragging on a lingering existence for a few years, died a natural death. But he would say to those who adduced this argument that 14 years ago and the present time were two very different periods in the agriculture of the county. We had witnessed great changes—great progress had been made; and in nothing had this taken place more than in the agriculture of the United Kingdom. Therefore he would hope that an agricultural association, established at the present period on the basis named, would meet a very different fate from that of its predecessor, and would probably enjoy a long and prosperous career of general utility (cheers). There was, however, another objection of a more serious character—that the establishment of one grand county association might have the effect of checking the career and cramping the means of the numerous Labourers' Friend Societies established throughout the county, and now pursuing so useful a course. He should be loath to recommend a plan that would in any way retard the career of those societies, convinced as he was of the great practical good they effected amongst the labouring classes; but he thought by confining themselves in this great society to the branches of agriculture he had mentioned, and steering clear of those branches of husbandry which it was the province of the Labourers' Friend Societies to foster and promote, they should indirectly, if not directly, confer on them a great benefit; for the higher the perfection they arrived at in agricultural implements, the greater would be the demand for well-skilled labour, and the more would be valued that industry and sobriety amongst the labouring classes which it was their object to promote (Hear). Such was an outline of the scheme he proposed to them, and he should be happy to receive their suggestions, assured that at whatever end they arrived, it would be creditable to themselves as a committee, and conducive to the cause of agriculture in general (Hear).

Mr. J. Clayden (of Littlebury) said he came from a distant part of the county, and having taken pains to inquire the feeling upon the subject in his district, he thought there was a prospect of fair and continued support for an association of this kind, and if well formed it would certainly be likely to succeed. They had had in their district a good society, which was certainly defunct, but its machinery still remained, to promote the object of an association of this kind. Much, however, would depend on the support of the landed proprietors; and he would suggest that they issue a few circulars, canvass the different districts of the county, and adjourn to March, when it should be seen what support they were likely to receive; for they would require a tolerably good sum, £500 or £600 a-year he should say, to support an association of this kind. If the proposition met the support of the landowners, the farmers, he believed, would respond to it heartily, and he earnestly wished to see it carried out. Perhaps Essex was not so much a breeding county as some others; but with fat and store stock united he thought they might have a good show, and a good society; he should say, let it not be too circumscribed (Hear). He moved "That the surplus fund of £336, arising from the subscriptions to the meeting of the Royal Agricultural Society, at Chelmsford, in 1856, be applied to the formation of a County Agricultural Association, for the aid and advancement of agriculture, and the promotion of enterprise and emulation amongst the owners and occupiers of land."

Mr. R. **Baker** said he had great pleasure in seconding the motion; he felt that Essex was standing far behind other counties in regard to agricultural societies at the present moment. They had had one at Chelmsford, one at Colchester, and one at Saffron Walden, all flourishing for a time; but it happened with local societies that after a time competition ceased (Hear). Therefore travelling from town to town would perhaps be the best mode of embracing the stock of the whole county. Still he thought there should not be more than three or four towns at which the meetings should be held, for transporting stock was an expensive concern, and the places selected should be those most convenient for the railway, or they would find their shows would be deficient. The benefits of these societies on a large scale had been and were fully appreciated; those little societies prepared the way for larger ones; and thus the shows of the society would prepare the county better for the Royal Agricultural Meeting (Hear). The details, however, of the association would be matters for serious consideration; but let them once establish the principle, and the details would follow, and he believed they should go on successfully.

The **Chairman** put the resolution, and it was adopted unanimously.

Colonel **Brise** said he did not think there was much difference of opinion as to the objects for which they were met, and he was happy to think there was to be an association of this kind established, Essex having men eminent in agriculture throughout the kingdom, who would give them the benefit of their experience and ability. The association, he believed, would be the means of promoting to a great extent the agriculture of the county; nor did he think, after the appropriate observations of the chairman, that it would interfere with the Labourers' Friend Societies; whilst it being an itinerating association, going from place to place in the county, would instil a little competition into all parties (Hear, hear). He thought a subscription ought to be opened at once, and that the matter should be left till they ascertained the opinion of the county on the subject. He moved—

"That a meeting of the association be held annually at such towns in this county as may hereafter be named, for the exhibition of stock and implements, and the distribution of prizes in those and such other branches of agriculture as may hereafter be determined upon by the committee."

Mr. W. **Fisher Hobbs** said he was glad to find that the view he took of this matter on a former occasion had met with the unanimous approbation of this meeting; he must also express his satisfaction at the observations of the chairman in opening the meeting, which he had no doubt would have the approbation of the landed proprietors and the tenant farmers of the county generally. The remarks of Mr. Clayden and Mr. Baker proved the feelings of the farmers on the subject, and he would reiterate their statements as to the feeling of the agriculturists in his own neighbourhood. His object, however, in rising was to suggest that they should not bind themselves as to where they should go in different years. Let them admit the principle of itinerating, but he should rather suggest that the towns should be left to invite the society; not that they should ask the towns to allow them to hold their meetings there. With this understanding, he should be happy to second the resolution. Before, however, they could get the society in working order there was a great deal that was required to be done, and much would depend on the intelligence and activity of the secretary (Hear, hear). He must be a man known to, and mixing up with, the agriculturists, so as to be at all times able to communicate with them and solicit their subscriptions. They would also require a good working committee, not a large one, for the purpose of framing the rules of the society; and it would be necessary to meet day after day before anything could be prepared for the general meeting. It was a question, too, whether there should be one general meeting or two in the year. They had tried both in this county, and sometimes they had succeeded and sometimes not. There had been a spring meeting for store animals and the sale of wool, and then at Christmas a fat stock show. He thought at first they had better not attempt too much; they should have a good meeting once a year, either in May or June, or perhaps in September, when they could have an annual ploughing match and a show of good roots, and where seed corn would be exhibited and competed for. He thought Mr. Baker would agree that, as to seed corn and roots, they had not the competition they used to have. There were other points, too, not usually taken up by societies of this description, which he thought might be dealt with in a manner beneficial to agriculture.

The resolution was put, and unanimously agreed to.

Mr. **Perry Watlington** moved—

"That the Society consist of president (to be elected annually), vice-presidents, a committee (of which the vice-presidents shall be *ex officio* members), and members: and that a yearly subscription of five guineas entitles a subscriber to the rank of vice-president, and of half-a-guinea and upwards to become a member of the association."

He was no practical agriculturist himself, but he had taken some interest in the various Labourers' Friend Societies, and he felt no fear at all that such an institution as had been suggested to-day would do any injury to these societies in the different localities (Hear). In a grand society of this sort, carried out in the way which had been stated, he saw nothing that could interfere with them.

Mr. J. **Christy**, Jun., seconded the resolution, which was adopted.

Mr. W. M. **Tufnell** said he thought there could be no possible doubt that an agricultural society, based on such principles as would command universal support, must be of great benefit to the county. He confessed that whatever misgivings he might have had on the subject, they had been very much removed by the feeling he had heard expressed to-day (Hear), and he was quite sure the best way of promoting the success of such an association would be by all putting their shoulders to the wheel, and having a long pull together (cheers). He was glad to see present gentlemen of great practical character in agriculture from all parts of the county, as this was more satisfactory than if they were all from one locality; and he thought they should take such measures as were necessary to prevent by their subscriptions the society falling into decay. Mr. Clayden, who was as well qualified to give an opinion as any man in the county, said they must have £500 to support such a society, and therefore he was glad to see the subscriptions had been fixed at half-a-guinea, as it appeared to be the opinion of practical men they should thus obtain a larger sum than if it were double the amount. With respect to Mr. Hobbs's observation as to the time of holding the meeting, he did not wish to criticise that gentleman, but he thought they should take the most popular feature in the agricultural field, and then there would be a large show of fat stock. Therefore he should like to see the meeting fixed at a time when the largest quantity of fat stock would be brought together. He moved—

"That the Chairman be requested to write to gentlemen in various parts of the county, asking for their individual cooperation with the association, and requesting that they will ascertain what support will be given to the establishment of such an association by the owners and occupiers of land in their own immediate neighbourhood; and that Mr. Burrell be invited to act under this committee until such a time as a regular secretary be appointed."

Mr. J. O. **Parker** said, as to the small societies, the cause of their failure had been pointed at; the petty jealousies of these societies had led to their failure, but here they took a large field and aimed at great results. He looked on these societies as following in the steps of the Royal Agricultural Society, their objects being to confer some benefits on agriculture; and he would rather not see any fat stock, for breeding was the great object, and he believed Essex was growing into its place as a breeding county. In a remote part of this county the other day he saw some good home-bred stock stalled, a fine home bred bull in a corner of the yard, petted by the occupier, and a number of home-bred animals on the farm. This showed what was doing; and he thought that they ought to promote the breeding of stock on the Essex farms, and that as a society they should have nothing to do with a ploughing match or a wool fair, or anything of that sort. If they introduced anything connected with the labourers, they should trench on the objects of those local societies, which they were so anxious not to infringe on. (Hear).

Mr. **CLAYDEN** said he thought the latter end of May would be the best time for holding the meeting, and he should say put breeding stock in the first rank; but at that period of the year much fat stock had often been held over, the weather was not too hot, and they would no doubt have a good show of fat stock at that time.

Mr. **FISHER HOBBS** called attention to the importance of holding out encouragement to the production of good agricultural implements. Essex had a number of small implement-makers as well as large, and they were rising up year by year, having, through the meetings of the Royal Agricultural Society, an opportunity of competing with the leviathan makers.

Mr. R. **BAKER** could not but think something might be done for the agricultural labourers, that they might have something for the prize-man recommended by each local Society. He thought the greatest encouragement should be given to neat stock and sheep. If they had the meeting in the summer they would have but little fat stock, if in winter but little breeding stock; but in May they would have sufficient fat stock to give *eclat* to the show, though they could not expect a great quantity. The great object, however, should be the improvement of breeding stock. In the old Society he brought the subject of breeding before the committee, for at that time he had not seen a calf weaned in the county; now breeding was carried on to some extent,and if they introduced a good breed, and good short-horns were spread over the county, they would soon see a different state of Essex breeding.

The resolution was carried.

A general committee consisting of sixty influential gentlemen was appointed.

Thanks were voted to the Chairman, which Mr. **DU CANE** acknowledged; and the meeting adjourned to Friday, the 26th of February.

THE TRADE AND COMMERCE OF CHICACO IN 1857.

We again avail ourselves of the information forwarded us by the commercial editor of the *Chicago Daily Press*, in his Sixth Annual Review of the Trade and Commerce of Chicago for the Year 1857. A year of more than ordinary calamity, in which some of the old and wealthy cities on the Atlantic seaboard have been obliged to succumb to the financial crisis, but that has left this city of Chicago, which is only the growth of the past dozen years, as sound as ever in its commercial relations, and with a vigour and elasticity which promises to be equal to any and every emergency. True it is that the trade of Chicago, being dependent on the produce of the surrounding agricultural country, poured into its stores and warehouses along three thousand miles of iron road, was on a more solid basis than many of those other cities which bore the traces of the late commercial ruin. Still, we were prepared to see in its returns symptoms of the general stagnation in trade; while we find the fact to be, that the prudence displayed by the bankers and traders of Chicago, aided by their solid capital—the accumulations of the energy and successful commerce of the last twelve years—has preserved her credit, and enabled her to achieve a commanding position amongst her sister-cities of the Union. The report says:

> "Though some of our country banks were forced to close their doors, and all the banks in Illinois and Wisconsin, except the Marine and the Chicago Banks of this city—which, to their honour be it said, paid the coin on demand for all their issues—virtually suspended specie payments, yet our bankers received at par the bills of all the country banks, and thus saved the business of the city from utter stagnation and ruin. The position which our bankers assumed towards our business men, and that of business men towards each other, was not one of hostility, but of mutual forbearance and support; and never, in commercial as well as in all other matters, was the motto more beautifully illustrated—'In union there is strength.'"

The consequence of this "union" was that, during the worst weeks of the panic, the shipments of wheat were one hundred thousand bushels per day, and of all cereals averaged nearly two hundred thousand bushels. By a reference to the commercial tables, we find that the exports last year, in spite of the low prices which prevailed, have not materially fallen of. They have exported more wheat, packed more beef, and shipped more cattle than in the previous season; and a large surplus is reported in the country for this (the coming) season's business. The prospects of this year are stated to be such as will far outstrip that of any previous one.

The grain trade of 1857 has been active, and, contrary to all expectation, shows but a very slight falling-off as compared with 1856, and an increase over 1855. Grain is the most important branch of the trade of Chicago. The receipts in the year 1857 was 21,856,206 bushels: this shows an advance over 1855, which was only 20,487,953 bushels, yet 1857 wanted about 3,000,000 bushels of being as large as 1856. The shipments of grain and flour, reduced to its equivalent in wheat, was, for 1857, 18,032,768 bushels, or 2,818,618 bushels less than those shipped in 1856; but it is 2,000,000 over the quantity shipped in 1855. These numbers give the general totals of all cereals; but if we look at the great staples (wheat and flour), we find that the increase of shipments of 1857 is over that of 1856. Thus, of wheat they exported 9,485,052 bushels; or, 1,147,632 bushels more than in 1856, and 3,286,897 bushels more than 1855. In flour likewise there is the large increase of 40,000 barrels more shipped than in 1856, the numbers being, for 1857, 259,648 barrels.

The provision trade of 1857 shows also an important increase over 1856; the number of cattle slaughtered in the past year being 19,127, or 4,000 over 1856. It is stated that before the scarcity of money occurred, the packers calculated on 30,000 head as being the quantity required. The quantity of live cattle shipped was 25,000, or 3,000 over the business of the previous year.

The figures given above will show our readers the importance and the rising position of this vast grain emporium. The grain trade of this prairie city, and its rise and progress, to those who have seen it in its infancy, appear a miracle. In 1838 it commenced by the shipment of 39 bags of wheat. In 1857 (not twenty years) it has attained the magnitude of over 20,000,000 bushels of all kinds of grain. Yet this is as nothing to what the position of Chicago promises at its full and future development. It is yet but in its infancy. From its situation—"the key and natural outlet of the great northwest"—it must become the mightiest interior commercial port of America. As the railways creep up still more north and west, so will the trade of Chicago increase, and that from the actual producers of the soil; so that to the merchants of the old world it must become the cheapest and best supplied market. The reviewer proudly says—

> "The grain trade of Chicago, it must be remembered, too, in this connection, has a much brighter future than most people dream of. As a mere depôt for the grain trade of the East, Chicago will not long remain. The markets of Liverpool, Glasgow, Hamburgh, and the whole Continent of Europe are fed by us; and it is not natural to suppose that we will remain an inland port when a canal of about fifty miles in length will carry our ships of a thousand tons burthen laden with grain to the St. Lawrence, and thence into the

broad waters of the Atlantic. No; Chicago—the commercial emporium of the entire Northwest—will, before many years, be placed in as direct communication with Liverpool, Havre, and Glasgow, as New York now is. When this shall have been accomplished—when our railroads have reached the valleys of the Missouri, the Platte, the Big Sioux, and the Red River of the North—then will the grain trade of Chicago begin to shape itself into a legitimate magnitude and importance."

The following receipts of flour and grain, with the shipments for the four past years, will show the importance of this city as a primary grain port:

	1854.	1855.	1856.	1857.
Wheat, bush..	3,038,955	7,535,097	8,767,760	10,554,761
Corn	7,490,758	8,582,377	11,888,398	7,409,130
Oats	4,193,385	2,947,187	2,219,897	1,707,245
Rye	85,961	68,068	45,707	87,911
Barley	201,764	301,805	128,457	127,689
Total	15,011,540	17,284,648	23,050,219	19,886,536
Flour into wheat	792,875	1,203,310	1,624,605	1,969,670
Total	15,804,423	20,487,953	24,674,824	21,856,206

The following is a table showing the shipments for the past four years:

Shipments of all kinds of Grain during the past Four Years.

	1854.	1855.	1856.	1857.
Wheat, bush..	2,206,725	6,208,155	8,337,420	9,485,052
Corn	6,837,899	7,517,625	11,129,668	6,814,615
Oats	3,229,987	1,899,538	1,014,547	416,778
Rye	41,157	19,318	509	..
Barley	148,421	92,082	19,051	17,993
Total	12,364,185	15,816,718	20,501,276	16,734,438
Flour into wheat	538,135	817,095	1,081,945	1,298,240
Total	12,902,320	16,633,813	21,583,221	18,032,678

One thing only is wanted to crown Chicago as the greatest port of America; that is, a ship canal. What are its merchants and traders about, that the project is not undertaken? The St. Lawrence is the natural outlet to the world—a ship canal to the St. Lawrence would complete the fortunes of all interested in the welfare of Chicago. Is there no company to be formed to carry out this work? By the Georgian Bay and Toronto is the best route. If this were accomplished we could join the reviewer in asking—"What will its future be?" and answer—"What Nature by the commanding position she gives Chicago has destined." To the north-west are the lovely valley of the Saskatchewan and the Red River of the north. Illinois, Iowa, and Wisconsin are but new countries half developed; while Kansas, Nebraska, and Minesota have but yet commenced an existence. Ten years ago what were they? Ten years hence what will they be? The completion of a ship-canal from Chicago to the St. Lawrence would answer both questions, and open to the old world a greater and cheaper source of supply of human food than we can now even dream of, and that in a direct line of transit from the producer to the consumer.

ADULTERATION OF FLOUR.—At the Castle of Exeter, on Friday, before a full bench of county magistrates, John Manley, a miller of Erwick, near Exeter, was charged with having mixed alum with his flour for the purposes of sale. A large piece of alum, weighing a hundred pounds, and some sprouted wheat and oats with small bits of alum in them, were produced. The latter had been seized whilst in process of being ground into flour. The defendant pleaded guilty, but said that he had adopted the practice of mixing only six ounces of alum with every sack of flour, in ignorance of the law. The wheat seized had been imported from America. It was dark and sprouted; and in order that the baker might make the bread rise and be able to "draw the batch," it was necessary to mix a small quantity of alum with it. He had been in the habit of selling the flour produced from this mixture as "seconds," and when it was made into bread his family had been in the habit of eating it. The bench convicted defendant in the penalty of £20 and costs.

ENGLISH & FOREIGN CORN MEASURES, AND IRISH CORN WEIGHTS.

The English value corn by measure, the Irish by weight. The former use a measure called a quarter, containing 64 imperial gallons; the latter use a weight called a barrel, which for wheat contains 20 stones, for oats 14 stones, and for barley 16 stones, each stone 14 lbs. It is manifest, therefore, that no exact relation does exist between the English measure and the Irish weight; a practical approximation, however, is obtained, by weighing a quarter of wheat of medium character, which is actually found to be 480 lbs. avoirdupois. In the same manner a quarter of medium oats is found to be 328 lbs. avoirdupois, and a quarter of medium barley 416 lbs. avoirdupois. By this means we reduce an English quarter of wheat, oats, or barley, to barrels of wheat of 20 stones to the barrel, to barrels of oats of 14 stones to the barrel, and to barrels of barley of 16 stones to the barrel, respectively, as in the following table, in which quarters of wheat are turned into barrels of wheat, quarters of oats into barrels of oats, and quarters of barley into barrels of barley:—

Eng. qr. of wheat, oats, or barley.		Wheat.				Oats.				Barley.		
		brl.	st.	lb.		brl.	st.	lb.		brl.	st.	lb.
1	=	1	14	4	or	1	9	6	or	1	13	10
2	=	3	8	8	=	3	4	12	=	3	11	6
3	=	5	2	12	=	5	0	4	=	5	9	2
4	=	6	17	2	=	6	9	10	=	7	6	12
5	=	8	11	6	=	8	5	2	=	9	4	8
6	=	10	5	10	=	10	0	8	=	11	2	4
7	=	12	0	0	=	11	10	0	=	13	0	0
8	=	13	14	4	=	13	5	6	=	14	13	10
9	=	15	8	8	=	15	0	12	=	16	11	6
10	=	17	2	12	=	16	10	4	=	18	9	2
100	=	171	8	8	=	167	4	12	=	185	11	6

From an inspection of this table, it appears 7 quarters of wheat are equal to 12 barrels of wheat, 7 quarters of oats to 11 barrels and 10 stone of oats, and 7 quarters of barley to 13 barrels of barley.

The French value corn by the hectolitre, which is a measure containing 2 bushels 3 pecks and 1 pint imperial measure. By this hectolitre corn is principally bought and sold on the Continent. Three hectolitres make 1 English quarter of corn, and 2 gallons and 3 pints over. According to the principles before enunciated, a hectolitre of medium wheat is equal to 11 stones and 12 lbs. avoirdupois, or to half a barrel 1 stone and 12 lbs. of wheat. A hectolitre of oats weighs 8 stone and 1 lb. avoirdupois, and a hectolitre of barley weighs 10 stone and 4 lbs. avoirdupois. By this means we reduce hectolitres of wheat, oats, or barley, to English quarters, into Irish barrels of wheat of 20 stones to the barrel, barrels of oats of 14 stones to the barrel, and barrels of barley of 16 stones to the barrel, as in the following table:—

Hecto-litre.		qr.	bh.	pk.	pt.		Wheat. br.	Wheat. st.	Wheat. lb.		Oats. br.	Oats. st.	Oats. lb.		Barley. br.	Barley. st.	Barley. lb.
1	=	0	2	3	1	=	0	11	12	=	0	8	1	=	0	10	4
5	=	1	5	3	5	=	2	19	4	=	2	12	5	=	3	3	6
10	=	3	3	2	10	=	5	18	9	=	5	10	10	=	6	6	12
100	=	34	4	2	4	=	59	5	10	=	57	9	2	=	64	4	8

NOTE.—A Scotch boll is equal to 6 bushels, therefore 4 Scotch bolls are equal to 3 English quarters.—*Purdon's Irish Farmers' and Gardeners' Almanac.*

THE RECENT PURCHASES OF IMPROVED STOCK, BY THE EMPEROR OF THE FRENCH.

However deeply we may feel for what has befallen the Emperor Napoleon, we cannot but rejoice that an all-wise Providence has so carefully watched over him, and preserved to his country one, who has certainly displayed no ordinary power or perception as the governor of so great a people. So much has been said and written on the late dastardly attack, that it scarcely comes within the pale of our duties to enter further into this painful subject—beyond the expression of our firm belief of there being scarcely an Englishman who does not sympathise with us in our joy at Napoleon's deliverence.

Happily for ourselves and our readers, we can turn to a more pleasing picture. When the Emperor and Empress paid a visit to our shores, and became the guests of Queen Victoria, they were naturally enough made acquainted with the course of English farming, as practised not only on the Royal Farms at Windsor, but also at Osborne, and where the most approved agricultural implements and machinery of this country were exhibited before them, and the finest specimens of stock also brought specially under their notice. The Emperor of the French, with that ability which is admitted to be so characteristic of him, has now resolved to apply himself to such a course of proceeding, as shall, in an agricultural point of view, be most likely to prove of the greatest advantage to his own people. In furtherance of this object we have within this day or so had the opportunity of making an inspection of a fine collection of Short-horns, selected with great care and judgment, by Mr. Wilson, who, as many of our readers are aware, has under his care the royal farms at Windsor. We were gratified to learn that, in the purchase of this stock, together with some South Down Sheep from the Duke or Richmond and Mr. Jonas Webb, Mr. Wilson has met with the greatest possible liberality on the part of breeders generally, and that every possible facility was afforded him in carrying out the instructions he had received from the Emperor. We trust that the great national object sought to be attained herein may, for the benefit of France, be in this wise fully accomplished, and that our neighbours may ultimately possess themselves of a breed which certainly takes the very highest rank in our own country.

The stock now about leaving England has been in course of collection for some time past. It contains specimens from many of the most distinguished breeders, from whose sorts we doubt not ere long as fine a herd will be reared in France as must gradually lead to the general establishment of the breed. It would be invidious to mention specially the name of any particular breeder where all have co-operated so handsomely with Mr. Wilson in carrying out so useful an object—increasing the food of the people. The stock going out will be located at the model-farms of St. Cloud and Versailles. They will be accompanied by Mr. Knowles, the agent of Captain Gunter. His convoy is thus registered:

COWS AND HEIFERS.

Venus .. Bought of	Mr. R. Lawson
Iris	Lord Hill
Golden Drop..........	Mr. Torr
Elegant..............	Sir C. Tempest
Harp.................	Viscount Hill
Syllabub	Mr. Fawkes
Alma.................	Colonel Kingscote
Heresy	Viscount Hill
Memorandum	Mr. Torr
Ballet Dancer	Sir C. Tempest
Queen Flower	Mr Torr
Maid of Lorn	Mr. Fawkes
Lady Geraldine........	Mr. Fawkes
Victoria..............	Mr. R. Lawson
Lady Amelia..........	Mr. J. Wood
Lady Anna	Mr. J. Wood
The Brown Kerchief ..	Mr. Fawkes
Ellen 3rd	Mr. J. Emmerson
Janetta 4th	Mr. J. Robinson
Juice................	Mr. J. Robinson
Winter Nelis	Mr. J. Robinson
Camellia	Mr. T. Chrisp
Sweet Vaentine	Mr. Torr
Summer Sun..........	Mr. Torr
Eugenie	Colonel Towneley
Autumn Rose	Captain Gunter
Millicent	Lord Feversham
Clara................	Mr. Thompson

BULLS.

Prince Alfred	Hired of Mr. R. Booth
Master Butterfly 4th ..	Colonel Towneley

CALVES.

In addition, there are eight calves the produce of some of the cows mentioned above.

Prince Alfred has been used at the Home Farm, Windsor. Master Butterfly 4th is a son of the renowned Master Butterfly (sold for 1,200 guineas), and from a daughter of Colonel Towneley's celebrated cow, Beauty, the winner of the first prize at the Lincoln Show of the Royal Agricultural Society.

A STATE OF TRANSITION.

The steam-plough would appear to be nearer a realization than many might suppose. The Salisbury failures are already forgotten, or satisfactorily explained. Mr. Smith, of Woolston, has now, it is said, upwards of thirty of his implements in use. Mr. Fowler still continues to work by contract; while Mr. Romaine is in better heart than ever as to the success of his scheme. The great test of such a process is becoming practicably susceptible of an application. There is to be economy in every possible way—a saving of money, labour, and time. The work, too, is to be better done, and the results proportionately greater. Mr. Smith, Mr. Mechi, or Mr. Fowler will either of them testify to a quarter more per acre, where steam-power has superseded that of horses. The improvements of late have been, in fact, so striking, that we are told to look upon the experiment as accomplished. Mr. Smith has sold his cart horses, and talks not only of what he himself, but what his "brother farmers," are doing. Mr. Fowler is yet more decisive in his dicta:—"as far as steam-ploughing was concerned, he considered his task done."

In a matter of this kind we look more especially to "the latest intelligence;" and this certainly goes far to support Mr. Fowler in what he here asserts. His more recent trial at Stirling was unquestionably a very triumphant one, backed as it was by the full premium of the Highland Society. Mr. Smith, of Woolston, again, offers us proof of equally high character, although coming, perhaps fortunately, through less public channels. Gentlemen who have worked his plan, not for an hour or two on a show day, but on their own farms and with their own men, volunteer him testimonials of its practical efficiency. Even beyond this the two most famous of all our plough-makers are directly concerned in this new branch of business. The Ransomes have Mr. Fowler's invention in their keeping; and the Howards are manufacturing Mr. Smith's implements.

There must be something in this; and both landlord and tenant may look to it a little closer than they hitherto have done. Of course it would never do for a tenant to be engaging in every new speculation brought out for his benefit, or in trying every experiment for that of other people. We believe that, as far not only as regards useful, but even promising discoveries, the farmers have of late years quite done their share of the good work. It is a serious matter, however, to ask a man to give four or five hundred pounds for a piece of machinery, or to lay out five-and-twenty or thirty pounds an acre in putting his land in order, before he is quite sure that either process may answer. This has been the case with our agriculturists. They have not treated the many plans for ploughing by steam with neglect or indifference, but have simply waited for something really practical and serviceable. It is only within the last few months that such a consummation has been arrived at.

Indeed, we never remember to have seen the subject so boldly faced as it was at the recent meeting at the Society of Arts. With one notable exception, there was not a speaker but who looked on ploughing by steam as very near its realization. The occasion was the reading of a paper by Mr. Algernon Clarke, that we give in full elsewhere. Himself somewhat of an enthusiast in the cause, Mr. Clarke still scarcely appeared to the advantage he might have done. His essay, in short, was written and sent in a year since. His able summary or history of the different processes for applying steam to the cultivation of the soil had consequently been very much anticipated—amongst others, in our own columns. His suggestions for improving the most successful of these inventions shared much the same fate—as in the instance of Fowler's plough, they have already been acted on. Nevertheless the paper will always have a value, as the impartial summing up of one who unites something of the mechanic's taste and skill with the education and the habits of the farmer. Mr. Clarke concluded by submitting a plan of his own. However this may succeed, it shows the soundness of his deductions that the very amendments he would propose have been adopted. Mr. Clarke could scarcely have desired a higher compliment.

The discussion that ensued should have been one of the most interesting of the season. The meeting embraced all the component parts for such a purpose. As we expected, from the time fixed there was scarcely a tenant-farmer present, although many far better prepared to speak to the point. There was Mr. Fowler to answer for his plough, and Mr. Smith for his. There was Mr. Romaine to tell what he was doing, and Mr. Halkett to declare what he wished to do. There was Mr. Boydell to offer his aid; Messrs. Ransome and Howard to keep the amateurs straight and fair; and Mr. Mechi to prove what cart-horses cost, and steam-ploughing *had* done. Unfortunately only three or four of these had a hearing. The discussion opened with the reading of a letter from Mr. Garrett, who "felt little improvement had been made in the art by any of the methods during the last two years," and who consequently still inclined to an undeveloped scheme of his own for a steam digger! Then Mr. Mechi dwelt on the marked superiority of ploughing by steam:—"There was a difference in the crop of wheat of at least a quarter per acre in its favour." The excellence of Fowler's work, the money (upwards of ten thousand pounds) spent in perfecting Romaine's machine, and the advantage of fork-digging, formed the chief features in the ex-sheriff's address. Mr. Ransome, also, bore testimony to the results of Fowler's method of ploughing; the superiority of the spade to the plough, and the damage done by the horses' feet. He was followed in turn by a Mr. Newton, who declared himself "not a practical agriculturist," and who did not appear to be a practical mechanic. He might well have left the discussion to those so much better qualified to carry it on. Mr. Fowler "ventured to say the system he had introduced was a step in the right direction. There could be no question that it was really a practical plan, inasmuch as it performed the ploughing at half the cost of horse-power, and the work was better done. Seven acres of sandy soil in the neighbourhood of Ipswich, ploughed by steam, had a yield of a quarter per acre more in crop." After admitting the superiority of hand spade cultivation over even steam ploughing, and bearing witness to what Mr. Boydell had done for steam traction, Mr. Fowler asked, "Who was to try all these experiments? Were the inventors to bear the whole brunt of that which was in fact a national benefit? The landlords hitherto had done little. The Royal Agricultural Society had given no help. He could only state that the trial of his system at Salisbury was appointed to take place on a steep hill, resembling the roof of a house, and the decision arrived at was that the steam plough would not answer. Notwithstanding all this, he was prepared to prove that he could plough at half the cost of horse power. It was plain they would get no assistance from the public or from the landed proprietors, who would, after all, derive the greatest benefits in the improved rental of their estates. As far as steam ploughing was concerned, he considered his task was done; but it was for such men as Messrs. Romaine and Boydell to carry their experiments further in another direction, and he was strongly of opinion that the public at large ought to help them in their work."

Mr. Smith, of Woolston, in answer to this, would receive no aid—neither from a society nor an individual—but stand or fall on his own merits. Mr. Smith's speech, which promised at first to be amusing enough, ended by becoming insufferably tedious. With an unpardonable want of discretion he fairly talked his audience out of the room; and when he came to reading long letters in his own favour, the effect produced was precisely similar to that of reading the Riot Act—"the crowd at once dispersed." We regret this the more, as Mr. Boydell, Mr. Romaine, and Mr. Halkett should all have had the opportunity, and were all, we believe, prepared to say something. The Society, however, has a very excellent rule of closing the proceedings at ten o'clock; and at a few minutes past that hour Mr. Fairburn left the chair, with Mr. Smith still, of course, in possession.

As the Chairman himself said, we are now clearly "in a state of transition as regards the cultivation of the soil;" while the result of this meeting would point to the more general introduction of steam power in this wise:—The union of the common portable farm engine with either Fowler's or Smith's system.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A MONTHLY COUNCIL was held on Wednesday, the 3rd of February: present, Lord BERNERS, President, in the Chair; Lord Southampton, Lord Portman, Lord Feversham, Right Hon. the Speaker, Hon. William George Cavendish, M.P., Sir Watkin W. Wynn, Bart., M.P., Sir Archibald K. Macdonald, Bart., Sir John V. B. Johnstone, Bart., M.P., Mr. Dyke Acland, Mr. Raymond Barker, Mr. Barnett, Mr. Barthropp, Mr. Bramston, M.P., Mr. Brandreth, Mr. Caldwell, Colonel Challoner, Mr. Druce, Mr. Brandreth Gibbs, Mr. Hamond, Mr. Fisher Hobbs, Mr. James Howard, Mr. Hudson (Castleacre), Mr. Jonas, Mr. Lawes, Mr. Lawrence, Mr. Milward, Mr. Pain, Mr. Pope, Mr. Sillifant, Mr. Robert Smith, Mr. Banks Stanhope, M.P., Mr. Thompson, Mr. Torr, Colonel Towneley, Mr. Turner (Barton), Professor Way, Mr. Jonas Webb, and Mr. Wilson (Stowlangtoft)

The Rev. Henry John Ingilby, of Ripley Castle, Yorkshire; and the Rev. Archer Clive, of Whitfield, Herefordshire, were elected governors of the Society.

The following new members were elected:

Astbury, John Steadman, Oulton House, Milwich, Staffs.
Bates, George, Blackhall Hall, Wickham-Market.
Bushel, Christopher. Hinderton, Neston, Cheshire.
Butterfield, Rev. G. B. B., Great College-street, Westminster.
Crane, James, Shrawardine, Shropshire.
Davies, D. R., Mere Old Hall, Knutsford, Cheshire.
Dodwell, Joseph, Manor Farm, Long Crendon, Thame.
Gould, John, Hyde Hall, Denton, Lancashire.
Grantham, Stephen, Paragno, New Kent-road, Surrey.
Lloyd, John, Belsize, Hampstead, Middlesex.
Malcolm, Matthew, Manor House, Kinston, Warwickshire.
Neame, Percy B, Solestreet House, Feversham, Kent.
Norris, John, Pully, Shrewsbury.
Paxton, Robert, Marsh Farm, Lower Winchenden, Aylesby.
Paddock, Henry, The Trench, Ellesmere, Shropshire.
Peel, Edmund, Bryn-y-Pys, Wrexham, Denbighshire.
Shackleton, John, Leeds, Yorkshire.
Smith, Michael, Cefn, Isla, Usk, Monmouthshire.
Thomas, Rev. Lewis, St. Hilary, Cowbridge, Glamorgan.
Thomas, Thomas, St. Hilary, Cowbridge, Glamorganshire.
Warner, Charles Borham, Jewin-crescent, Aldgate, London.
Williams, Rev. Edm. Turberville, Mount Balam, Chepstow.
Villiers, Hon. Fred. W. C., Sully Hall, Northamptonshire.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the report on the accounts of the Society, from which it appeared that the current cash-balance in the hands of the bankers was £454. He laid on the table the usual quarterly statement for the information of the members, and reported that the authorities of Chester had transmitted Exchequer Bonds to the amount of £1,800 (payable on the 8th May next), as their contribution towards the expenses of the Chester Meeting in July next. The Council ordered, agreeably with the recommendation of the committee, that a circular letter should be addressed to such members of the Society as were in arrear of their subscription.

EDITORSHIP OF JOURNAL.—Mr. Thompson, Chairman of the Journal Committee, presented the following report, which was adopted by the Council:

1. That the Council be recommended to appoint a paid Editor, but that the Journal be published, as hitherto, under the general superintendence of the Journal Committee.
2. That the Journal Committee, or such other Committee as the Council may appoint, be requested to make such inquiry as shall enable them to report to the next monthly Council the name of some competent person or persons to undertake the duties of Editor; and also to report the amount of salary which they think adequate to the requirements of the office.

On the motion of the Right Hon. the Speaker, seconded by Mr. Jonas, the very cordial and grateful thanks of the Council were voted to Mr. Thompson, Mr. Dyke Acland, and Mr. Wren Hoskyns, for the manner in which they had performed the laborious and responsible office of Joint-Editors of the Journal.

CONSULTING CHEMIST.—Sir John V. B. Johnstone, Bart., M.P., Chairman of the Special Chemical Committee appointed at the previous Council, presented the following report, which was also adopted.

1. That the fixed salary of £300 per annum hitherto given to Professor Way be given without alteration to the person who shall be selected to fill the vacant post of Consulting Chemist to the Society, for which he will be expected to make analyses for members, on terms approved by the Chemical Committee; to give three lectures annually, if called upon so to do; and to attend the meetings of the Council whenever required. Also, that £200 per annum, allotted to specific subjects of investigation, be, as heretofore, offered in the first instance to the Consulting Chemist.
2. That Dr. Augustus Voelcker, Professor of Chemistry to the Royal Agricultural College at Cirencester, be recommended, to fill the vacant post of Consulting Chemist to the Royal Agricultural Society of England.

CHESTER MEETING.—Lord Portman, Chairman of the General Chester Committee, made reports, and entered into detailed statements connected with the arrangements of the Society's ensuing Chester meeting, to be held in the week commencing Monday, the 19th of July next. Those details had reference chiefly to the requisite inquiries to be instituted, and reports to be made to the Monthly Council in March by the General Committee, in conference with the Local Committee, on the accommodation afforded at Chester for a dinner of the Society, and on the plan to be adopted for the show-yard subsequently to the personal inspection and report of Mr. Manning. The Council adopted the recommendation of the committee, founded on Mr. Brandreth Gibbs's report, on the purchase of wheat and barley in the straw, for the trials of machinery, and the selection of land for the trial of the steam-cultivators. They also ordered that a clause should be introduced into the Prise-sheets, stating that all certificates received after the 1st May for implements, &c., and the 1st June for live stock, should not be accepted, but returned to their respective senders. The Secretary reported that the principal Railway Companies had signified their willingness to grant the same concessions in favour of the Society's Exhibition at the Chester Meeting, as on the occasion of former country meetings.

Poultry-Show.—On the motion of Lord Portman, seconded by Mr. George Turner, the resolution was passed (of which Mr. Milward had given notice), that there should be no Show of Poultry at the Country Meetings of the Society after the current year.

Member of Council.—On the motion of Mr. George Turner, seconded by Mr. Dyke Acland, Colonel the Hon. Alexander Nelson Hood, of Cumberland Lodge, Windsor, was elected one of the General Members of Council, to supply the vacancy created by the transfer of Viscount Eversley to the class of Vice-President.

Standing Committees.—The standing committees for the year were appointed.

French Show of Horses and Cattle.—The Earl of Clarendon transmitted to the Council a copy of the note addressed to him by the French Ambassador, enclosing copies of a notice issued by the Emperor of the French, having reference to an intended meeting to be held at Alençon from the 17th to the 20th of May next, for the exhibition of horses and cattle, with the view to the improvement of their several breeds. This show will be confined to animals bred in the district, and the property, for three months previously, of the exhibitors.

Card of Meetings.—Mr. Frere transmitted a form of card of meetings, which he suggested should be annually forwarded to every governor and member of the Society not in arrear of subscription.

Weekly Meetings.—Mr. Morton transmitted, on the part of the proprietors of the *Gardeners' Chronicle*, an application for reporters to attend the weekly meetings.

The consideration of these two communications was postponed.

The Council adjourned to the 10th inst.

A weekly Council was held on Wednesday, 10th of February: present, Colonel Challoner, trustee, in the chair; Hon. Colonel Hood, Mr. Alcock, M.P., Mr. Raymond Barker, Mr. H. B. Raymond Barker, Dr. Camps, Mr. Dent, M.P., Mr. Gray, Mr. Fisher Hobbs, Mr. Tull, and Professor Way.

Communications were received—1. From Professor Hartstein, of Bonn, enquiring the present state of public opinion in England respecting the application of liquid manure; 2. From Dr. Lyon Playfair, asking for information on the subject of wool; 3. From the Minister of Agriculture of France, a collection, on the part of the Government, of agricultural works published in his department since the former collection presented to the Society three years ago; 4. An application from the Mexican Company for a collection of seeds, which the Council referred to Messrs. Thomas Gibbs & Co., the seedsmen to the Society; 5. From Mr. Bandel, of Baltimore, specimens of his Wyandotte Prolific Indian Corn, grown from seed obtained from the Wyandotte Indians in 1858; with a specimen of the stem raised from a single grain.—Mr. Alcock, M P., called the attention of the Council to the advantages which he thought Mr. Halkett's system of land-cultivation might probably be found to possess on further inquiry and experience of its capabilities.

The Council adjourned over Ash-Wednesday to the 24th of February.

BATH AND WEST OF ENGLAND SOCIETY

FOR THE ENCOURAGEMENT OF AGRICULTURE, THE ARTS, MANUFACTURES, AND COMMERCE.

A numerously-attended meeting of the Council of this Society was held at Waghorn's Railway Hotel, Taunton, on Saturday last, the Right Hon. Lord Courtenay in the chair.

The Cardiff Meeting, 1858.—Mr. John Widdicombe, the Director of the Show-Yard, reported that the necessary notices had been issued inviting tenders for enclosing the Show-Yard, and also for supplying the dinner and refreshments in connection with the forthcoming meeting at Cardiff.

The Barnstaple Meeting, 1859. — A deputation from Barnstaple, consisting of Lord Viscount Ebrington, F. Maunder, Esq. (Mayor), and Messrs. Avery, Harris, Gilbert, and Langdon, waited upon the Council, and represented that the local committee formed for inviting the Bath and West of England Society to that town next year had obtained subscriptions to the required amount (£800), and, in addition to that sum, the deputation were prepared to guarantee on the part of the inhabitants a large number of special prizes for local purposes out of the surplus funds. The deputation elicited from the Council information as to the nature and extent of the ground that would be required for the site of the show-yard and the trial fields; and the Council nominated a sub-committee to visit Barnstaple on Thursday, the 25th of February, to confer with the local committee on the amount of accommodation offered, and to inspect the sites.

New Members.—Rev. W. Beaver, Cowbridge, Glamorgan; Messrs. R. T. Crawshay, Cyrfilla Castle, Merthyr Tydvil; O. F. Williams, Treguilow, Cornwall; H. T. Smith, Devonport; F. Pitts, Alphington, Devon; G. Radmore, Thorverton, Devon; J. Beavise, Dorchester; W. Partridge, Dulverton; W. Hobbs, Lechlade, Gloucester; E. Spender, Manor Mead, Plymouth; G. May, Modbury, Devon; T. Strong, Dunchideock; W. Farrant, Wellington; Fred Sharland, J. Collier, J. Knowlman, J. Broom, W. Stoer, Culmstock; J. Doble, Buckland St. Mary; J. P. Matthew, Hemyock.

CURE FOR COLIC IN SHEEP.

Sir,—Will you allow me a small space in your columns, that I may communicate to your agricultural readers the following particulars?

I have a number of sheep feeding on Swede turnips with cut hay. An unusual number having been attacked with colic, and every case proving fatal, I determined to try the following remedy: "Ten drops of laudanum, ten drops of essence of peppermint, one tea-spoonful of the spirits of turpentine, and one table-spoonful of sweet oil." I have in no instance found this fail to produce a cure within a couple of hours, although the sheep have been perfectly paralysed, and unable to stand.

I shall be glad if this suggestion should prove of use to others, and I remain, your obedient servant, J. F.

THE PRESENT PRICE OF CORN.

The prices of agricultural produce vary more than those of any other description of natural productions. Price and value being two distinct results—the first having relation to the amount produced at market—the second to the cost of production.

The rapid decline in the prices of grain, meat, and farm produce of this country at the present moment are not dependent either upon our home production or consumption, or upon both conjointly; but rather upon large importations, and the checking the ordinary transactions of merchants, manufacturers, and traders at one and the same instant, by the derangement of our monetary system; and thus the effects operating upon the corn and meat markets of the metropolis are transmitted to every other local market of the kingdom.

This centralization of the corn markets of Europe, as exhibited in Mark-lane, is transmitted instantly to all the other parts, and consequently *value* as defined by the cost of production, has no relatien whatever to it in the result. So long as a large supply of foreign wheat and grain continues to reach our ports, prices will continue to fall, until the average minimum price of the whole of the imports is attained, and *vice versâ*, if a diminished supply falls so low as to produce a scarcity—then and not till then will prices again advance—probably to an extent far beyond the value.

These sudden fluctuations affect the farmer more than any other class of producers, his operations extending over a larger space of time than appertains to others will not allow him to expand or contract his operations accordingly; and it mostly happens that whenever the price of his productions fall to their lowest point, the cost of producing has been carried out at its highest rate—especially as regards rent. To the rent-charge and labour at least a moiety of the whole cost remains unaltered for a long time after prices have so declined—and more especially the tithe rent-charge, which from being based upon an average of the seven years last expired, rises to the maximum point as at present, and so for a time continues whilst grain is at its minimum price.

Tithe rent-charge, by the present arrangement, entered upon for obtaining its averages, acts very injuriously to agriculture; and as it in reality produces no beneficial result to the receiver, there cannot be any reason adduced why an alteration should not be made in the mode of deducing the averages—and the merely reducing them from seven to three years would at once effect an object, so desirable and to be attended with equitable and beneficial results to both payer and receiver.

When we review the principal causes of fluctuation in the marketable value of farm-produce, it becomes apparent that not only tithe rent-charge, but rent also ought to be subject to a like adjustment. But beneficial as such a change might be, little doubt exists that it would not only be objected to, but be absolutely refused by the majority of occupiers, so adverse are they to any change, however beneficial it might be to their future interests. Indeed, when we refer to fluctuations that have occurred in the last ten years, it is matter of astonishment that such prejudices should exist; the reason, probably, arises from the human mind invariably viewing past events as not likely again to occur. Hope leads everyone to expect a change for the better, and therefore the chances of an advance on prices, without having to make a corresponding advance on rent, far outweigh the probability of a decline in prices attended by a corresponding reduction in the quantum of rent.

In the year 1846 we find that prices ran from a low range suddenly to a high one, the extremes being fully 100 per cent.; in the following year they again fell in like ratio, continuing with slight fluctuations until the war commenced with Russia, in 1854, and then gradually rising until the year 1857. Thus they remained until the autumn following, when they again fell to fully 50 per cent.

The fluctuations during the present century have amounted to 400 per cent. and upwards. Wheat has reached £10 per imperial quarter, and has fallen below £2 per quarter, and other produce in nearly equal proportions. "What has happened since may happen again"—if not to the same extent, still sufficiently to require us to guard against the contingency.

In commencing this article we adverted to the effects produced throughout the kingdom by the fluctuations in prices upon Mark-lane, and the influence they produce upon prices in local markets. It ought now to be borne in mind by all agriculturists that the supply of English grain will, during a time of peace, have but little influence upon prices. Mark-lane has now become the emporium of Europe for all descriptions of grain, and the average prices in that market will be governed by the average prices of the continental markets, subject to the addition of cost, freight and profit. But inasmuch as the supplies may far exceed the demand at certain periods, the losses attendant upon importation will be extended to the producers of this kingdom, and will so continue until a reaction is produced, and supply and demand have changed their relative positions.

It, therefore, behoves the British cultivator to weigh these remarks as they deserve. It is now quite certain that the prices of agricultural produce must depend upon the quantity imported; and that the prices of English grain cannot, under the most favourable circumstances, in future far exceed those of the continent of Europe. Whilst, upon the other hand, a large influx of foreign wheat upon the market may cause them to descend far below their intrinsic value, even to such an extent as to prove most ruinous to our home producers.

TITHE COMMUTATION TABLES.

Mr. Willich, the Actuary of the University Life Office, has lately published his Annual Supplement to "*The Tithe Commutation Tables.*" The value of tithe rent-charge depends on the septennial average prices of wheat, barley, and oats. As it may interest our readers, we insert from one of Mr. Willich's tables the annual average prices per imperial quarter during the last seven years, viz.:

	Wheat.		Barley.		Oats.	
	s.	d.	s.	d.	s.	d.
1851	38	6	24	9	18	7
1852	40	9	28	6	19	1
1853	53	3	33	2	21	0
1854	72	5	36	0	27	11
1855	74	8	34	9	27	5
1856	69	2	41	1	25	2
1857	56	4	42	1	25	0

The Quarterly Averages for 1857 may interest our agricultural friends who have let their land at corn rents.

	Wheat.		Barley.		Oats.	
	s.	d.	s.	d.	s.	d.
Lady-day Quarter, 1857	56	10	45	8	23	5
Midsummer ,, ,,	56	9	42	6	24	9
Michaelmas ,, ,,	59	11	40	2	27	3
Christmas ,, ,,	52	0	40	1	24	7

SWING *versus* WHEEL PLOUGHS.

It has been long acknowledged that in the multitude of agricultural implements to be met with on the south of the Tweed, there are many which, if not absolutely valueless, can, at the best, be only designated as expensive toys. At the present moment, the writer has an instance before his mind, of a gentleman who is undoubtedly the leading agriculturist of the county in which he resides, and in whose lumber shed the array of cast off implements (many of them brought out by first-rate makers) would form no mean adjunct to the attractions of a moderately strong agricultural exhibition. A prejudice has hence arisen in the minds of many Scottish farmers against the use of any English manufactured implements. Now, there are amongst us thrashing machines, haymakers, drills, manure distributors, cultivators —nay, even ploughs, which, we hesitate not to say, would be a decided acquisition, if freely used by the go-ahead agriculturists who can afford to pay such long rents on the other side of the Border.

It is with the last-named implement that we have at present to do. Often have we, in days bygone, when living at the foot of the Grampians, heard it sneeringly observed by Scotch ploughmen, with reference to their English brethren, that "they needed wheels to make their ploughs go staight." Now, there is a mistake here; practice shows that there is such—for actions speak louder than words. We have known Scotch ploughmen in several English counties; but we have ever seen that they speedily appreciated the value connected with the easy adjustment and guidance of a well-made Howard's, Ransome's, or Ball's wheel plough. We have known several cases of Scotch ploughs being *imported* to the midland and western counties, though we know not one of them now seeing actual service. In Warwickshire, the favourite plough is that manufactured by the eminent firm, Messrs. Howard, of Bedford. At the last county ploughing match, nineteen-twentieths of those entered were of this make; and we question whether, in the best districts of Scotland, under equal circumstances, better work could have been accomplished. In Class 3 were boys that in the north would not be regarded as fit to do more than rake after a couple of scythes in harvest, or feed the cows on a small farm in winter. These were ploughing, and ploughing well. Now, we do not here enter into the question as to whether it is desirable to employ such *ploughmen* or not. *That* would involve several considerations. We only ask whether such a turn-out could have been made with swing ploughs? We think not. This then—for the work was well executed—proves their ready and efficient adjustment. And is not an implement the better, and the more manageable for being readily and easily adjusted?

In the matter of draught, we are unable to refer to any dynamometrical results, and have only personal judgment to go by. Our belief is, that in drawing a good wheel plough, well set, there is less labour expended than with the swing plough. Then there is the fine level bottom, or floor, obtained for the furrow—"a point in which many Scotch ploughs are sadly deficient." Also that most useful adjunct, a skim-coulter, to aid in burying clover, grasses, or other vegetable matter. Again, the excellent fastening to the coulter, so decidedly superior to the stone-and-wedge system. Likewise the case-hardened share, which, by having its upper surface softer than its under one, naturally continues sharp by the act of wearing, and thus saves many a journey to the smithy. Any of the wearing parts of the plough are readily renewed by a common country blacksmith, the fittings being obtained from the manufacturers.

It will be observed that these remarks have chiefly referred to the Bedford ploughs, though they are not, assuredly, intended as derogatory towards others. We speak from no personal feelings; the Messrs. Howard we are unacquainted with, and we have only written as to what we *know* of their implements. Still, a false delicacy need not prevent us saying to Scottish farmers, "Give Howard's ploughs a trial—a fair and honest trial it will be, for the Scottish maxim is, 'A fair field, and no favour'—and we doubt not but the results will be satisfactory."

In conclusion, we would quote the words of one who knows the subject well, and who says, "With many, particularly the Scotch, the wheels are a fatal objection; their plea is, that they are an unnecessary complication, and that the weight and draught are thereby increased." With regard to the latter, it was shown at a late meeting of the Highland Society of Scotland how ill-founded was the prejudice, for the only English plough competing was proved to draw one-third or one-fourth lighter than the best Scotch plough exhibited, besides performing its work in a very superior style. How can it be, ask some, that a wheel-plough can take less power than a swing, whilst you have so much more weight to draw? This has been a vexed question for years, whilst the thing lies in the smallest possible compass. All ploughs are constructed with a certain inclination to go down into the soil. In a wheel-plough this tendency to draw into the soil is regulated, or obviated, by the wheels, which turn the weight thus thrown upon them, relieving the friction on the point and sole. On the other hand, the swing-plough is kept from entering the soil too deeply by the ploughman, whose whole weight is often required upon the handles to maintain the proper depth. It will at once be seen that this weight at the end of so long a lever throws much additional friction on the sole, which is of itself sufficient to account for the great difference in draught. The objection with regard to complication is purely ideal, the wheels being readily adjusted to any required depth and width, and in the midland counties of England we have seen mere boys using them, and making most beautiful and uniform work.

THOS. BOWICK.

Kenilworth, Jan. 14th, 1858.

HOW TO FARM CLAY LANDS.

SIR,—"Lucus a non lucendo" is, I believe, something like a dark lantern, and is well represented in the phrase of "carrying coals to Newcastle."

I ventured last year to give some general advice to one o your correspondents, who was burdened with 500 acres of clay land; now, strange as it may appear, I, then an oracle, wait for a response on the very same subject. The question I now beg to propose for consideration is how to farm clay land of *inferior* quality at a profit, with wheat at a low price, and every probability of a still farther decline in its value. Many valued productions I have read, offering all sorts of profitable systems and suggestions for the cultivation of clay soils; and in many cases I have felt convinced that the writers on the subject know very little practically as to the capital needed to effect the utter change, both on the part of landlord and tenant, which their advice would require.

First, I wish to explain the nature of the clay soils, for the profitable cultivation of which I should be glad to receive suggestions, based on practice, conveying a system which any tenant farmer with fair average means may safely adopt. The soil I refer to, is met with in large tracts in the Midland counties amongst others, is about five inches deep, with a yellow subsoil, and rubble or clay stone below, generally full of water.

Secondly, I must state that, as far as my experience goes, "circumstances over which there is no control" or "urgent private affairs" seem generally to be pleaded as excuse for that indispensable article in expensive cultivation of this description of land—viz., "capital."

A tenant with large capital will seldom engage in such an undertaking, except with a long lease and at a very low rent; and often a landlord's "burdens" prevent him indulging in the improvement of his property at the expense of his income.

Hence, for a tenant with ordinary capital, say £10 per acre, farming this sort of land and drained in an effectual manner, with buildings and accommodations usually met with, advice is respectfully asked, from some of those who in the time of low prices, found they could work with a profit. For final particulars, broad clover, except with the interval of many years, cannot be grown with certainty; beans also have not depth of soil sufficient to insure a crop. There is one plant, however, always present to give a relish to the crust—the wild garlic or crow onion.

If no kind friend comes forward to solve doubts and questions that are raised, I must fain hereafter trouble you with a few facts drawn from costly practice, and for proof substantiating say "Experto crede."

Yours obediently, G.

MR. RAREY, THE AMERICAN HORSE-TAMER.

When the sportsman or the horseman, who has studied the animal all his life, and knows too well his freaks of temper and easily alarmed disposition—when such a one is told that the worst-tempered brute that ever was handled, or the greatest savage that ever was put into a box, can be conquered and quieted in five or ten minutes—when simply by leaving with him, for some such space of time, an unassuming young man, all the vice is effectually taken out of him—and when he hears, moreover, of there being no pereeptible means by which this is accomplished, but that the thing is merely "a secret"—When, we say, a sportsman reads or is told of all this, what in ninety-nine times out of a hundred will he do? With a pleasant smile, and a slight shrug of the shoulders, he will most likely answer at once that "it must be humbug." Or, if he does not say so, he is sure to think so, which comes to very much the same.

Now there is just one step beyond this. He must exercise another of his senses before he quite condemns the discovery. By this, thanks to *The Times* and other channels, he has no doubt *heard* a good deal of the horse-tamer; but if our friend is a practical man, as we will take him to be, he will go a step further, and *see* him. He will judge for himself, as many have already. He will go something more than sceptical as to what is to be palmed-off on him, and he will come away convinced, at least, there is a great deal in it. We state this as the general impression left on all who have hitherto seen the effects of Mr. Rarey's system, and we give it as our own. Horse-tamers and Whisperers are, or have been, by no means unknown amongst us; and we walked into Mr. Anderson's yard quite ready to assure ourselves that we were going to witness some clever trick, or some individual exhibition of personal power of hand or eye, that might be as curious and amusing, perhaps, as a scene in the Circus, and that would be all.

We found the exhibiter, a young well-made American, just recognizable from the tone of his voice as a States-man, in an inner yard in company with a goodish-looking black horse. In one word, he was doing just what he pleased with this animal. And there stood Mr. Anderson and Mr. Rice ready to assure you that a week since they, with all their knowledge of their business—George Rice with all his fine temper and fine hands—could do nothing at all with him. He had been sold, and returned as restive and unmanageable, and there was no help for it but to take him back. He was one of those sad brutes, that with all the look and power of two or three hundred guinea horses, sink down into street cabs sheerly from the impossibility of ever being able to trust them. Mr. Rarey wanted a patient, and here was one that promised to try all his art. He requested only one quarter-of-an-hour's conversation with the unreasonable creature; at the end of that time the black horse was black only in colour. His nature was changed, and the devil fairly gone out of him. We saw what we write. We saw this violent-tempered animal that had been, stand quietly in the middle of the yard, with a plain hard-and-sharp in his mouth, and the rein hanging loose on his neck—and we saw the American wheel a heavy barrow straight up to his head and round him, without the horse flinching in the least. Then the horse-tamer cracked a carriage-whip over his head, and still the animal stood as placidly, and, apparently, as unconcerned as ever. Mr. Rarey next proceeded to mount him, and here perhaps to a sportsman was the most pleasing part of the whole performance. With the rein still loose on his neck, the horse moved and turned, just as the rider moved his hand. We have all seen a "wonderful pony" in the Circus stop and twist round in obedience to the promptings of a tolerably well-pointed whip. But there was nothing of this sort with Mr. Rarey. There was no effort on his part, and there was nothing anxious or nervous in the look of his horse. In fact, he was so calm, his eye so steady and so much at ease, that it was difficult to imagine he ever could have been the vicious obstinate brute too many could speak to. "The manner" of the horse gave one more the notion of an old family pony, not so much subdued, as won over by kind treatment and long usage. You got on him "any-how," and got off him "any-how." One old sportsmen mounted the horse with his half-cigar in his mouth, and slid down again over his tail. A week since the same horse would have kicked his brains out, could any man have been found fool-hardy enough to attempt such an act. Mr. Rarey concluded this demonstration of his power over the horse by taking him into a stall, and lying down by his side—knocking his hoofs together—pillowing his head on his quarters; with similar feats, not quite so seemly to look at, although all tending to prove his complete subjugation of the animal.

The horse-tamer declares his means are simply rational and kindly treatment. He denies the use of any drug, or appliance that can in any way injure the proper spirit or true nature of the horse. He maintains his secret can be imparted to others, and can be as effectually used by them as by himself. And he guarantees that a horse once conquered is conquered for ever. It is only fair to say that the recent performances before her Majesty and the Court all tend to confirm this. Lord Alfred Paget, to whom the secret has been entrusted, has already appeared as a successful practitioner of the art, while the horses operated upon have shown no disposition to return to their former evil ways.

We must repeat there is a good deal in this—more than many a man who has been contending all his life with vicious and restive horses will like at first to admit. It is suggestive, however, at least, that no one who has seen the effect of what is done, but has gone away with a very different opinion to that he entertained on only hearing of it. Mr. Harry Hill, who strolled in to witness the experiment with very doubting eyes, ended by asking if his colts could not be broken on such a principle? Of course they can. Horses shy of water can be made to face it, and, indeed, to do a vast deal more than we mean to tell of here, purely because we do not want to have our word questioned. On the first available opportunity let every one go and judge for himself. Mr. Rarey is accompanied by Mr. Goodenough, who, we will answer for it, from our own experience, will treat every application made to him with all proper courtesy and respect.—*Sporting Magazine for February.*

SIMPLE REMEDY FOR THE PLEURO-PNEUMONIA.

Sir,—Being a constant reader of your valuable paper, I have seen several remedies recommended for that fatal disease called pleuro pneumonia, which is now so prevalent amongst cattle and sheep, in all parts of the country, to the great loss and almost ruin of many stock masters; and which I think may be, in many cases, prevented by a little attention and the following treatment, which I have applied for many years, with great success; indeed, I never knew it to fail, if properly carried out; and I have had some little experience, having had the management of stock and sheep for many years in different counties. The pleuro-pneumonia visits us at all seasons, but, generally, most in the autumn or winter—no doubt from the foggy and wet state of the atmosphere, which affects the lungs, particular of those that are pre-disposed; therefore, about the last week in October, when the stock are generally taken into the yard, I give to each beast, according to size and age, from half-a-pound to a pound of Stockholm tar, and a handful or two of salt, mixed; taking care, at the time, to rub it well into their nostrils. This I repeat once a week, if the disease is prevalent near us, only in less quantity; if not, I repeat it once a month, and at all times, when I buy in a fresh lot of beasts, give them a dose of tar and salt. When I first heard of the disease, we had about 90 head of cattle, and had a two-yr old heifer attacked, which died in four days. The disease was very destructive all around the neighbourhood; I gave all the other stock a dose of tar and salt, and we had no more taken. I then recommended the same dose to my neighbours, and had the pleasure of seeing the same result. There is no doubt about the disease being contagious; I therefore advise all persons who keep cattle, to be particular in keeping the houses and sheds clean, and lime-washed once a year at least. For sheep, I give about two table-spoonsful of the same, with the like result. Any gentlemen who may think proper to try this simple preventive, will find themselves amply repaid for their trouble, and if they will please to make known to me the result, I should be greatly obliged. What I have stated is from my own practical experience; and if you think it worth a small space in your valuable pages, I should take it as a great compliment to myself, and hope it would prove a benefit to all.

I am, sir, your humble servant,

R. Mayston,

Bailiff to Mrs. Dixon, Stansted Park.

Emsworth, Hants.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

This has been a remarkably fine month for all out-door farm operations. In most parts of England they have progressed steadily, and are now quite as forward as in the general run of years. Thus far, matters are satisfactory; but, if we turn our attention to the state of the grain trade, we shall find matter for serious consideration. Not that the fall in the value of produce since we last wrote has been extensive—indeed, the fluctuations in prices have been comparatively trifling—but in various quarters gloomy anticipations have been indulged in as regards the future. Wheat is now about the cheapest article of consumption, and present appearances of the trade certainly indicate future depression, notwithstanding that the manufacturing industry of the country is recovering from the late panic, that money is very abundant and cheap, and that consumption has somewhat improved of late. There are, however, influences at work calculated to prevent any upward movement in the quotations. In the first place, the stocks of wheat in the hands of our farmers are unquestionably large for the time of year; in the second, the French markets continue to be heavily supplied with all kinds of produce; and, in the next, we have as yet received but a limited quantity of wheat from the United States, the growth of 1857. In that year the yield was an unusually fine one, both as to quantity and quality; but the movement to the shipping ports, owing to the commercial panic, was very small during the last three months of the season. For instance, since the 1st of September the shipments of wheat were only about 3,000,000 bushels, against over 7,000,000 bushels in the corresponding period in 1856; hence, present stocks in the United States are very large, and prices continue to rule low. In France, too, nearly the same state of things prevails, and the fall in the quotations since the 1st of July has been *forty-one per cent.*; nevertheless, with open ports, or nearly so, present prices are eagerly accepted by the growers. The fact is that the French agriculturists and millers have been dissappointed as regards the effects of the new law permitting the export of produce. They, at one time, looked forward to considerable excitement in the trade and consequently to higher prices, as the result of the permission given to ship grain and flour; but they appear to have overlooked the fact that the growth of corn last year, in all the grain districts of the world—and especially in this country—was the largest on record. True, the partial failure of our potato crop might be taken as a proof that more grain would be consumed; but as the growth of potatoes on the continent has turned out very large, and as immense quantities have been shipped to this country during the last two months in fair condition, the losses have been thus partially met by the foreigner. But even on this important matter much might be written, and, if our information be correct, it would now appear that the actual losses have not turned out so extensive as they were at one time supposed. At all events, there is no actual scarcity of English potatoes, though we admit that their quality is not such as to command what may be termed a ready market. What, then, shall we say in reference to the probable future range in the value of wheat and other articles? It must be admitted that there is no scarcity of supply either here, in France, or in the United States. The supply, we are of opinion, will be found more than equal to general consumption, and if the system—still persevered in to an unusual extent, more especially in reference to the importations from the north of Europe—of selling at any price, be continued, it is impossible to say at what figure the downward movement in wheat will stop. But even with present abundance, it appears to us that it is absolute folly for the foreign growers to inundate our markets with more produce than the demand can take off. Fortunately, our farmers have acted upon the defensive principle; in other words, they have declined to thrash out larger quantities of wheat than the local millers are able to take off; still, there is one important element wanting in the trade, viz., speculation, which, with moderate arrivals, might again be in the ascendant, and give an additional, perhaps an important, tone to the trade.

Barley continues to be in fair request, and the quotations, compared with wheat, rule somewhat steady, although the exports of grain-spirit to the continent have fallen off to some extent. Most other kinds of spring corn have supported previous rates tolerably well, yet the currencies of inferior oats have had a drooping tendency. From Ireland the shipments of oats and other articles have been on a very moderate scale; but from Scotland, large quantities of wheat, barley, and oats continue to be forwarded to the south.

The cattle trade has been in a depressed state both in London and in the provincial markets, and prices generally have given way. The supplies of live stock exhibited in the metropolitan markets have not increased in number, though there has been a decided improvement in the weight and condition of the beasts; still the great falling-off in the consumption of meat in Manchester, Birmingham, &c., has had the effect of inducing many parties to forward unusually large quantities of meat to Newgate and Leadenhall. These supplies have been disposed of at low prices, and consequently the consumption of London has been chiefly met by country-killed supplies.

Although the supplies of hay and straw have not increased, the demand has fallen off and prices have given way. Meadow hay has sold at from £2 10s. to £3 16s.; clover do., £3 10s. to £4 16s.; and straw, £1 4s. to £1 9s. per load.

For all kinds of foreign and colonial wool the demand has been in a most unsatisfactory state, yet the decline in prices has not been extensive. English wools have met a slow inquiry on former terms. The present stocks of colonial in London are 28,175 bales, viz.: 5,186 Sydney, 7,834 Port Philip and Portland Bay, 390 Adelaide, 7 New Zealand, and 14,758 Cape. In addition to these supplies, there are in warehouse 1,145 bales East India and 297 China. It is a remarkable fact that not a single bale of Van Diemen's Land wool is on hand.

The root crops are lasting well, and very large quantities are now offering at low prices. In some parts of the country large patches of turnips are offered for sheep-feeding free of expense.

In Ireland and Scotland the wheat trade has ruled heavy, and prices have continued to give way; spring corn, however, has supported previous quotations. For stock-feeding the weather has been favourable.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that the metropolitan market has been very moderately supplied with beasts and sheep, more especially with the latter, during the whole of the month, trade generally has been depressed, and a fall of from 2d. to 4d. per 8lbs. has taken place in the quotations. Even at that amount of depression, the butchers have purchased cautiously, and wholly for present wants. This state of the trade has induced the opinion in some quarters that consumption in London has greatly fallen off. Such, however, we believe is not the case, since we find that the receipts of meat from our provinces, as well as from Scotland, have been considerably in excess of most corresponding periods of the year. No doubt consumption in our manufacturing districts has seriously declined, and this fact has induced those who have been in the habit of supplying Birmingham, Manchester, &c., somewhat liberally, to turn their attention to London, and the low charges by the various railway companies for the conveyance of meat, viz., *one penny per ton per mile*, have had the effect of increasing the supplies to a considerable extent. Then, again, we must not forget that wool, hides, and skins are worth more in some parts of the country than in the metropolis; so that, although meat in Newgate and Leadenhall has been sold at very low prices, there has been no actual loss, in a comparative sense, in the present increased mode of supplying the wants of London.

In Holland, and on some other parts of the continent, stock is now relatively dearer than in England; consequently the importations into London have exhibited a further decrease. Last month they were as follows:—

Beasts	714	head.
Sheep	822	„
Calves	784	„
Total	2,320	head.
Same time in 1857	4,720	head
„ 1856	3,087	„
„ 1855	2,839	„
„ 1854	10,683	„
„ 1853	12,433	„
„ 1852	9,123	„
„ 1851	11,828	„

Thus it will be seen that we have received an unusually small importation, the falling off, compared with February, 1853, being over 10,000 head.

The total supplies shown in the great Metropolitan Market have been as under:—

Beasts	18,276	head.
Cows	466	„
Sheep	69,070	„
Calves	1,091	„
Pigs	1,559	„

COMPARISON OF SUPPLIES.

Feb.	Beasts.	Cows.	Sheep.	Calves.	Pigs.
1857....	17,629	457	74,430	1,172	1,975
1856....	19,642	495	99,950	673	2,614
1855....	17,436	385	91,180	596	2,705
1854....	20,091	520	92,441	1,023	2,279
1853....	19,308	470	86,910	2,098	2,420

This comparison shows that the supply of sheep disposed of has been smaller than during the last five years.

From Norfolk, Suffolk, Essex, and Cambridgeshire, 10.020 Scots and short-horns came to hand during the month. From other parts of England the receipts were 3,850 of various breeds, from Scotland 2,340 Scots, and from Ireland 1,012 oxen and heifers.

About 1,200 shorn sheep have made their appearance in the market, and which have sold at from 6d. to 8d. per 8lbs. beneath those in the wool. It is to be regretted that shearing should be commenced at so early a period, because it frequently happens that the loss upon each head is fully 2d. per 8lbs., as the butchers are never disposed to purchase stock out of the wool during inclement weather. Wool may be worth more in some parts of the country than in the metropolis; but our impression is that the flockmasters lose money by early shearing—that is to say, if the sheep are intended for immediate sale.

Beef has sold at from 3s. to 4s. 6d.; mutton, 3s. 2d. to 5s. 2d.; veal, 4s. to 5s.; pork, 3s. 2d. to 4s. 6d. per 8lbs. to sink the offal. In the corresponding month in 1857, the best beef realised 5s., the best mutton 6s., the best veal 5s. 8d., and the best pork 5s. 2d. per 8lbs. The fall, therefore, compared with last season, is a serious one, and many of the graziers who bought store animals at high rates are now losing money.

Nearly 40,000 carcases of meat have been received up to Newgate and Leadenhall markets during the month. The trade generally has been in a most depressed state at drooping currencies.

Beef has sold at from 2s. 10d. to 4s. 4d.; mutton, 3s. to 4s. 6d.; veal, 3s. 6d. to 4s. 6d.; pork, 3s. 2d. to 4s. 6d. per 8 lbs. by the carcase.

Letters from Holland state that the supplies of stock likely to be shipped to this country during the present year are still limited, that prices rule high, and that purchases of both beasts and sheep still continue to be effected on French account. In the north of Europe the supplies have rather increased, but in France meat is still ruling high. Apparently, therefore, there is no prospect of our receiving large importations between this and the end of the year; indeed, it is possible that we shall have to report even a further decrease in them. The demand, therefore, will be chiefly met from home sources, and it occurs to us that the late fall in the quotations will be shortly recovered, though we admit that prices during the coming season are likely to rule moderate.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

APPLEBY HORSE FAIR.—A few very good animals were shewn, and for some, good prices were obtained.

BANBURY FAIR.—The supply of beef and mutton, of all kinds, is very good, and although sales are complained against by a few, yet the trade done may be considered satisfactory, prices being much the same as last fair. The quality of the cattle is really excellent, and best things met with a speedy sale.

BEDALE FAIR.—We had a thin show of fat stock, which sold readily at rather higher prices. In lean stock and in-calvers there was also a short supply, but they sold well, and prices remained unaltered. Beef, 6s. to 7s. per stone; mutton, 5d. to 6d. per lb.

BEVERLEY FAIR had a good attendance of buyers. A limited supply of first-class horses had ready sale; a good show of medium and inferior ones had dull demand and prices low. A very limited number of cattle had slow sale, and prices still lowering.

BRIDGNORTH FAIR was very depressed, the supply of stock being very small, and the attendance of dealers smaller than usual. Sheep sold from 7d. to 7½d., and some fine ewes went as high as 7½d. Cows sold from 6d. to 6½d. Cows and calves were about the same as last fair. Pigs continue low. The horse fair was ill supplied; and what stock was there was in very bad condition. The highest price fetched for small waggon horses was 30*l*.

BROUGH FAIR.—There was a large show of well-bred beasts, and a number of influential buyers and jobbers, but all seemed inclined not to give the prices asked, which soon caused a different aspect, and the market became flat, and was much down compared to the fair held in January; except calvers, which went off well. Groups of cattle were unsold.

CARLISLE HORSE FAIR.—The display of horses on this occasion surpassed anything of the kind for the last thirty or forty years, both as to numbers and quality, the market being quite full. The number of saddle horses was not very great, neither was the quality of this class first-rate. We do not remember having seen a smaller number of old and low condition animals on a similar occasion. The amount of business transacted was not so extensive as might have been expected, and price had a downward tendency.

DEVIZES FAIR.—The show of worked-off oxen, suitable for grazing purposes, was large, and sold at about £2 in £20 less than last year; at this reduction a fair trade was done, although a few lots were taken away unsold. Barreners, in-calvers, and milch beasts were in short supply, and sold at about £1 per head less money. Beef, from 10s. to 11s. per score. The great feature at this fair was the worked-off oxen; and it is admitted, we believe, on all hands, that a few years at the plough is decidedly beneficial for grazing, and improves the flavour of the meat if not worked too long. As regards the horse fair, we cannot say much. Mr. Edmonds, of Wroughton, sold two or three good cart horses, and we heard of one or two useful nags being sold in the stables; in other respects little business was done.

DORCHESTER FAIR was scarcely so large as on previous occasions; but business may be fairly said to be brisk, and on every description of stock prices were good, and a more than average amount of business was done.

DUMFRIES HORSE FAIR.—The number of horses was at no time greater than 300, or about a fourth less than the number brought forward last year, and, as usual, they were almost entirely draught horses. The general proportion of very good horses was not great, and the fall in that class was not more than 15 per cent. from the rates of last February. On secondary stock the reduction was at least 20 per cent.; on third class about the same; while for lower grades there was no demand. Mr. Foster sold 10 on Monday to another dealer at prices varying from £40 to £50; and he was asking £60 for a fine draught mare, for which he could have got upwards of £70 last year. Messrs. Teenan and Clarke sold a grey mare for £52; a powerful horse for £53; another mare, a splendid animal, for £56, the buyer in the latter instance having been a farmer from the neighbourhood of Kirkcudbright; and they also disposed of 4, about £50 each, to a purchaser from Peeblesshire. Mr. Brown, Hardgrave, sold a pair of beautiful draught horses for £100; and Mr. Carruthers, Broklehirst, sold another similar animal for 50 guineas. Such are some of the transactions in the best class of horses; for other kinds a degree inferior the prevailing rates were from £30 to £40; and a considerable proportion of good animals for farming labour changed owners at £25 and under.

EGREMONT HORSE FAIR was very thinly attended, both of horses and purchasers.

EXETER FAIR was numerously attended by farmers and dealers, and well supplied with cattle of the primest quality. Perhaps the number of dealers present was greater than butchers or consumers wished to see. There was no alteration in prices. The best fat beef realised from 9s. 6d. to 10s. 6d.; barreners, 7s. to 8s. per score; cows and calves, £12 to £48.

GLOUCESTER MONTHLY MARKET.—The supply of beef was large, but of inferior quality, and a flat sale; of mutton the supply was good, and the whole was soon disposed of. Beef, 6d. to 6½d.; mutton, 7d. to 7½d. per lb.

KELSO FORTNIGHTLY MARKET.—There was a good show of fat cattle, and several of the lots were of excellent quality. There was a good attendance of buyers, with a brisk demand, and nearly the whole were quickly cleared off at prices a shade better than our previous market. Beef may be quoted at 6s. 3d. to 6s. 9d., and a few superior brought about 7s. per stone. There was a small supply of sheep, which sold readily at 6½d. per lb. A fair show of cows, which were selling at from £10 to £16.

LEDBURY FAIR.—The supply of stock was rather short. Some prime fat cows were offered, which realised good prices. Buyers were numerous, and most of the stock offered was sold at an early hour. Fat cows, 6½d. to 7d.; ditto sheep, 6½d. to 7d.; store ditto, 26s. to 38s. each; fat pigs, 8s. 6d. per score; store ditto, 28s. to 36s. each.

LEOMINSTER FAIR.—There was not a large quantity of fat beef; the highest figure was about 6½d. per lb. Best wether mutton brought 7d. per lb. There were many buyers of stores, and good barrens brought full prices.

NEWTON STEWART HORSE FAIR.—There was scarcely the average number of horses, and very few sales took place, farmers wishing to obtain the prices of the last two or three years; but any sales which took place were from 15 to 20 per cent. less. There were very few dealers present.

NORTHALLERTON FAIR.—A thin show of all descriptions of stock, with plenty of buyers. Lean beasts sold at lower prices. Beef, 6s. 3d. to 7s. per stone. The number of horses shown was very great, and dealers from all parts were numerous. Several first-rate hunting and carriage horses were readily sold at high rates, and inferior ones 20 to 30 per cent. lower than last year. Draught horses were in demand, at good prices.

OXFORD GREAT MARKET.—There was a short supply of good beef and mutton, and as the demand was rather considerable all went off at prices quite as high as last market—beef, 4s. 4d. to 4s. 8d.; mutton, 5s. to 5s. 4d. per stone. Store cattle and sheep were not so plentiful as on former occasions, and a dulness prevailed, very few changing hands. The pig market was unusually dull with a short supply—good English hogs from 8s. 6d. to 9s.; porkers 9s. to 9s. 6d. per score.

PENRITH HORSE FAIR.—There was a tolerably large show of farm horses, and a quantity of old hacks. The business doing was very limited, and prices much below those of last year. For a very superior animal we heard of £40 having been offered.

RUGBY FAIR.—There was a good supply of beef, at from 5½d. to 6½d.; a short supply of mutton, from 6d. to 7d. Store beasts easier to buy. A short supply of horses, at low prices.

SHREWSBURY FORTNIGHTLY MARKET.—The best fat heifer beef sold from 6d. to 6½d. per lb.; fat calves, 6d. to 6½d. per lb.; useful store cattle selling at fair prices; also good cows and calves at high figures. Fat wether sheep, 7d. to 7½d. per lb. Fat pigs, 5d. to 5½d.; store pigs still very low.

TEWKESBURY FAIR was very well attended, and a large supply of stock, mostly fat. Demand limited, and sellers had to dispose of their stock at very low prices. Beef sold at 5½d. to 6d.; mutton, 6d. to 6½d. The horse fair was thinly attended, and what sales were made were at very low figures.

YORK FORTNIGHTLY MARKET.—Calving and dairy cows, and all kinds of grasing beasts, had fair sale, at former rates. A moderate supply of fat beasts sold at 6s. 6d. to 7s. per stone. A fair show of mutton sheep went at 6d. to 6½d.; superior ditto, 7d. per lb. A good supply of grasing sheep had fair demand: hog sheep, 22s. to 43s. per head. The market is a little on the improve.

CALENDAR OF AGRICULTURE.

Sow oats and barley on dry and early lands during dry weather; also spring wheat, vetches, peas, beans, and flax-seed. Sow lucerne on well-prepared ground, trenched or very deeply-ploughed and richly dunged. Sow carrots and parsnips on good warm sandy loams, that are in good condition from previous treatment, without the present application of fresh manure: steep the seeds in leys of urine, and dry them with lime. Sow sainfoin, and dress the young plants with gypsum. Apply artificial manures and top-dressings on young wheats, barleys, and clovers—as soot and salt, malt combs, rape-dust, nitrate of soda, pigeons' dung, and gypsum. Sow cabbage seeds for summer plants, and lay composts on grass lands.

Plant hops, and make the hills six feet distant each way. Use well-rotted dung, and put four sets in each hill, one in each corner, and cover them lightly with earth, leaving the upper end of the set just in light of day.

Continue the planting of forest trees and of young hedges, but cease if dry weather sets in. The cutting of underwoods will now be finished.

Watered meadows may now be stocked with light animals. Set traps for vermin, and spread molehills.

Plough fallows for green crops, and also clay lands for bare fallows, if the weather be dry. Shut up the fields that are intended for hay, and finish laying composts on grass lands. In wet weather thrash grains, and carry dung from the yard to the heaps in the fields.

In many situations ewes will drop lambs very largely in this month. Feed with juicy succulent food, as beet, cabbages, and turnips, and provide a warm shelter, which is equally necessary with the food itself. The shelter sheds must be dry, and frequently littered with short straws and chaffs. Remove the ewes and lambs from the paddock to the pasture field regularly, as the lambs get strong.

Keep the poultry-houses dry and warm, and set all kinds of eggs for hatching. Feed amply, and provide clear spring-water.

Finish the killing of hogs for bacon, and keep all young pigs for summer stores, and for early feeding next winter.

The latest fattening bullocks must now be sold, or pushed forward by superior feeding. The long days will now require a greater supply of food, as daylight always induces animals to eat more.

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

The indications of wintry weather which were given at the close of January, after some rapid fluctuations and a moderate fall of snow, were verified in the progress of the past month, which closed with great sharpness. Still, as it has remained on the whole unusually dry, we do not find the promising aspect of the growing wheat abated in this country; but in America the absence of a snow-covering has left the autumnal wheat too much exposed, and it is in some localities presenting a sickly appearance. On the other hand, there were recent complaints from parts of Spain that the crop was impeded in its growth for want of rain, which has since fallen, but not in sufficient plenty. It will not be safe, therefore, to make too sure that another heavy crop will follow the last, as the most critical periods have all to be passed through. The wheat trade has, however, not revived, an ample six months' stock being yet in growers' hands, and foreign supplies being good, notwithstanding the fact that nearly all are either sold to a heavy loss, or placed in granary to prevent it. The money market has indeed passed from scarcity and "high pressure," to a burdensome abundance, with very low rates of interest; but trade and confidence have not yet returned. The month opened with complete depression, and markets have generally declined 2s. to 3s. per qr., and though an impression has been lately gaining ground that the "minimum" price has been about reached, with the country pointing upwards, the sudden overthrow of the Palmerston Ministry may again unhinge the minds of capitalists, and prevent speculative purchases, notwithstanding a fall in the averages to 45s. 8d. per qr. The least probability, however, of a war with our present allies would soon change the face of things, and the plenty now offering in the markets be materially reduced. Lord Derby or his successor will doubtless endeavour to prevent such a calamity, but Orsini's projectile may yet be the occasion of a general flame.

Potatoes have held out better than expected; but as flour is comparatively lower, there must be a larger consumption, and millers keep low in stock, and proportionately dependent on events. Foreign quotations by last advices were as follows:—

France, somewhat improving, quotes the price of good wheat at Paris about 42s. per qr., and flour 31s. per sack, or 1s. per sack below Norfolks. At Seville, flour 50s. per sack; mixed wheat 53s., hard 58s. 6d. per qr. Cadiz: Flour, 50s. 6d. per sack. Marianopoli wheat, at Barcelona, 46s. 9d. per qr.; worth the same here. Ghirka wheat at Odessa was quoted 42s. to 44s. 8d. (selling here at 46s.), hard to 55s. per qr., with a fair business doing against the opening of the port. At Leghorn, native wheat was 48s. 6d. per qr.; Genoa quoting 50s. for Berdianski. Saidi wheat at Alexandria was quoted 27s. 4d.; selling here at 31s. 6d. per qr. The Baltic ports, which are closed except to steamers cutting their way at great expense, show a range of prices nearer to our own; good red at Stettin being procurable at 40s. per qr., fine high mixed at Danzig 46s. 6d. per qr.; but the stock there of all sorts was at present only about 28,000 qrs. Rhenish wheat in Holland was worth 46s. 6d., and in Belgium, good quality ranged from 43s. to 44s. 6d. per qr. New York has a large stock of flour, which was looking down; but wheat was buoyant, white Southern being quoted at 1 dol. 40c. per bush., equal to 48s. per qr.; red 1 dol. 22c., equal to 42s. per qr.

The first Monday opened with moderate supplies of both English and foreign wheat. The morning's supply from the near counties did not exceed an average, the weather being again frosty; but there were many samples left over from the previous week, and a large fleet of foreign vessels being reported off the coast, there was an unusual depression, so that it was necessary to submit to a reduction of 2s. to 3s. per qr., to make any way. Foreign was equally difficult to place; but holders were not so ready to make an equal concession. This account had its effect in the country, but generally the reduction was not so heavy, some places only noting a difficulty in sales; Sheffield and Birmingham making the decline only 1s. per qr., but there was almost a panic at Leeds, at 3s. per qr. less money. Liverpool, on its first market, gave way 2d. to 3d. per 70lbs., without any quotable reduction on the following Friday. Saturday's markets generally noting a fall of 1s. to 2s.; but Friday, in London, was the dullest day known for some time, and a good deal of fine Kentish was sent back unsold.

The second Monday, as respects the addition of foreign samples, was much below the average, with only a moderate quantity of English. This morning, there was a fair show from Kent, with less from Essex. The day was clear and frosty, and highly favourable to the condition of the samples; and those millers who did not avail themselves of Friday's depression, found, for picked samples, they had to pay the prices of the previous se'nnight: but, though more tone was evinced by all holders, it was a poor day as respects business, a good many parcels of English being left on the stands. The tone of the trade improved in London as the week closed, Friday realizing an occasional advance of 1s. per qr. for picked parcels of English and foreign. The country reports varied. Some of the early markets in Lincolnshire showed progress with the downward movement; but the general tendency was to advance. Hull, Louth, York, and several other places, made no change; Birmingham, Boston, Wolverhampton, Peterborough, Derby, and Lincoln were all 1s. per qr. better; Norwich, Leicester, and Grantham noting an advance of 2s. per qr. Liverpool, on Tuesday, was dull, holders refusing to accept lower rates. On Friday, 2d. per

70lb. more was realised, but only on good American red qualities.

The third Monday commenced on moderate arrivals, both English and foreign, with not many additional samples, in the course of the morning, from the near counties. Factors began by asking about 2s. per qr. more money, and in some instances there were sales at improved rates; but as the day wore, the buoyancy ceased, and where any clearance was effected, it could only be said that fully the previous rates were made for home-grown wheat. Picked foreign red, like Rostock or Louvain, was taken at quite 1s. per qr. above the rates of this day se'nnight. The country markets generally were unaltered or rather dearer. Derby, York, Leicester, Grantham, Peterborough, Louth, and Birmingham were firm; Boston, Lincoln, and Lynn, as well as Chelmsford and Gloucester, were 1s. per qr. higher; Market Rasen and Market Harborough quoting an advance of 1s. to 2s. per qr. Liverpool, on Tuesday, kept the previous market's advance, but on Friday gave way 1d. per 70lb., though on the same day in London, 1s. per qr. more was occasionally made.

The last Monday in the month exhibited a better supply of foreign wheat, though the near counties sent up a very moderate quantity. The weather remained clear and frosty, and the condition was improved, but the change in the Ministry seemed to exert a sinister influence, and the rates of the previous week were with difficulty sustained, the market being only saved from a decline by the scanty show of English samples. Leeds and Liverpool on Tuesday tallied with the London report.

The supplies into the port of London in the four weeks have been 16,147 qrs. English, including some Scotch, with 33,969 qrs. foreign; making the weekly average 12,529 qrs., against 20,065 in January; the decrease being chiefly in the foreign arrivals. The foreign imports into the United Kingdom in the month of January, were 342,841 qrs. wheat; 304,688 cwt. flour. The averages have declined from 48s. 8d. to 45s. 8d. in four weeks; the London averages in the same time have receded from 50s. 8d. to 46s. 10d., showing a difference of 3s. 8d. per qr.

The price of Town-made flour commenced at 43s., and remains unaltered. In Norfolke there have been some changes, the second Monday showing a decline of 1s., which was recovered on the third. American and French samples have given way fully 1s. per sack and barrel. The supplies in four weeks were 75,621 sacks English: 6,611 sacks, 7,134 barrels foreign; showing a deficiency as compared with January to the extent of 3,391 barrels, the sacks being about equal.

The fluctuations in the barley trade have been so slight that prices have scarcely changed, but the averages show a decline from 37s. to 36s. 3d. The finest quality of malting has continued scarce on the London market; the middling sorts have been less abundant; and the lower kinds from the East, which have occasionally arrived in large quantities, have been finding vent by the low prices accepted as horse food in mixture with light oats, which in moderate proportions have been found to answer well. Of this there was a large supply in the second week of the month, influencing this description fully 1s. per qr. down, but the closing Monday was more cheerful in its aspect for all sorts, the supply of home-growth being small. During the four weeks the receipts have been 11,382 of our own growth, and 43,523 qrs. foreign, giving a weekly supply of 13,726 qrs., which only shows a slight decrease on the previous month. There were imported into the United Kingdom in January, 94,154 qrs. The lower kinds of this grain may improve as stocks get exhausted, but the lateness of the season is against any advance in fine sorts, though picked parcels for seed went off well at the month's end.

The trade in malt has been heavy through the month even in the finest qualities, inferior descriptions having sold at lower rates.

The oat trade, with below an average supply throughout the month, has continued declining, prices having receded about 2s. 6d. per qr. As noted before, the liberal use of inferior barley, at a less proportionate price, has reduced consumption; while the quantity yet remaining in store, though not heavy now, has served to keep sufficient samples in the market to prevent any brisk inquiry. The first Monday noted a decline of 1s. per qr. An equal fall was noted on the second, and the two other Mondays were rather cheaper. Irish supplies, though almost wanting since the first Monday, have been made up by larger receipts from Scotland, in better condition; and foreign arrivals on the last day were beginning again to appear, being shipped in the mild weather. The arrivals have consisted of 5,403 qrs. English, 19,196 qrs. Scotch, 15,737 qrs. from Ireland, and 32,510 qrs. from the continent—making the weekly average only 17,204 qrs. The averages, however, of this grain show an increase of 8d. per qr., proving that prices have not so declined in the country. The total imports in January were 61,528 qrs.

Beans and peas in the London market, though a heavy sale throughout the month, have undergone little change. New samples of the former first declined 1s. per qr., and then recovered. Peas, especially boilers, have been excessively dull, and the sudden set-in of frost has not at all sent them up. The arrivals of beans during the month were 4,184 qrs. English and 3,340 qrs. foreign, or 1,881 qrs. per week against 3,872 qrs. in January. Of peas, the total foreign receipts were 204 qrs. and the English 1,730 qrs., or 533 weekly against 488 qrs. per week last month. Hog peas have only retained their value by their scarcity and the absence of foreign.

The linseed trade has been steady, only experiencing 1s. per qr. decline; but sales have been slow. Cakes retain their favour, and find a free placement as cattle feed.

The seed trade has commenced, but without briskness, and the first prices of foreign imports have not been sustained, a large supply of inferior English having appeared before the demand came thoroughly on, and there is not much appearance of high prices either for red or white cloverseed this season. Trefoil has been steady. Canary and hempseed have maintained their value, and the non-appearance of foreign spring tares in quantity has greatly enhanced their value. Reports say the crops abroad have failed; but we think the prices now paying (7s. per bushel) will draw supplies. Mustardseed and rapeseed have been firm; coriander and carraway almost without variation.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

Wheat, new, Essex and Kent, white	43 to	52	red	40 to	48
Norfolk, Linc. and Yorks., red				40	48
Barley, malting	34 to	37	Chevalier, new	37	40
Distilling	32	35	Grinding	26	30
Malt, Essex, Norfolk, and Suffolk	58	66	extra	68	—
Kingston, Ware, and town made	58	66	,,	68	—
Brown	54	56		—	—
Rye	—	—		30	34
Oats, English, feed	20	23	Potato	25	32
Scotch, feed	20	25	Potato	24	31
Irish, feed, white	20	22	fine	24	30
Ditto, black	19	21	,,	—	24
Beans, Mazagan	32	35	Ticks	33	34
Harrow	33	36	Pigeon	37	42
Peas, white boilers .. 40 44..Maple	41	43	Grey	39	41
Flour, per sack of 280lbs., Town, Households..38s.,			fine	40	43
Country	33	34	Households	37	38
Norfolk and Suffolk, ex-ship				31	32

IMPERIAL AVERAGES.

For the last Six Weeks:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans s.	d.	Peas. s.	d.
Jan. 9, 1858	47	10	36	3	22	8	33	6	39	3	40	5
Jan. 16, 1858	48	8	37	0	22	1	33	7	39	3	39	11
Jan. 23, 1858	48	9	37	6	22	4	32	0	39	4	39	5
Jan. 30, 1858	47	6	37	1	23	1	34	10	39	5	40	4
Feb. 6, 1858	46	9	36	8	23	0	31	2	38	11	41	0
Feb. 13, 1858	45	8	36	3	22	8	30	9	39	3	41	1
Aggregate average	47	7	36	10	22	8	32	8	39	3	40	4
Same time last year	58	0	45	7	23	5	39	8	40	4	39	6

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat	91,399 qrs.,	45	8	Wheat	100,932 qrs.,	56	5
Barley	82,258 ..	36	3	Barley	71,957 ..	44	11
Oats	14,649 ..	22	8	Oats	17,662 ..	23	6
Rye	189 ..	30	9	Rye	28 ..	44	4
Beans	7,739 ..	39	3	Beans	6,571 ..	39	6
Peas	1,641 ..	41	1	Peas	1,749 ..	39	7

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 40s. to 70s., extra —s., white	50s. to 75s.
Trefoil	18s. to 23s.
Tares, Winter, new, per bushel	5s. 0d. to 6s. 0d.
Mustardseed, per bush., new 15s. to 17s., brown	13s. to 15s.
Coriander, per cwt.	20s. to 26s.
Canary, per qr.	80s. to 86s.
Linseed, per qr., sowing —s. to —s...crushing	60s. to 62s.
Linseed Cakes, per ton	£10 0s. to £10 10s.
Rapeseed, per qr.	68s. to 70s.
Rape Cake, per ton	£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

Cloverseed, red 52s. to 70s., white	50s. to 75s.
Trefoil	17s. to 22s.
Tares, Spring, per bushel	7s. 0d. to 7s. 6d.
Hempseed, small, per qr. Dutch	42s. to 47s.
Coriander, per cwt.	17s. to 26s.
Carraway ,,	44s. to 46s.
Linseed, per qr., Baltic 58s. to 59s.....Bombay	57s. to 59s.
Linseed Cake, per ton	£9 10s. to £10 10s.
Rapeseed, Dutch	76s. to 80s.
Rape Cake, per ton	£5 0s. to £5 10s.

HOP MARKET.

LONDON, MONDAY, Feb. 22.—The business of our market is very limited; but, from the few recent samples on offer, prices have been maintained with tolerable firmness. Our currency is as follows:

Mid and East Kents	70s. to 90s.,	choice 120s.
Weald of Kents	56s. to 63s.	,, 70s.
Sussex	52s. to 56s.	,, 62s.
Yearlings &c.	21s. to 35s.	,, 50s.

MEASE & WILD.

POTATO MARKETS.

SOUTHWARK WATERSIDE, MONDAY, Feb. 22.—During the past week our arrivals, both coastwise and from foreign ports, have been very considerable. Prices have been with difficulty maintained in most instances. The following are this day's quotations:—

Yorkshire Regents	140s. to 180s.	per ton.
Lincolnshire do.	120s. to 160s.	,,
Dunbar do.	140s. to 170s.	,,
Do. reds	80s. to 85s.	,,
Perth, Fife, and Forfar Regents	110s. to 135s.	,,
Ditto ditto reds	60s. to 85s.	,,
French whites	90s. to —s.	,,
Belgian do.	80s. to —s.	,,
Ditto reds	90s. to 100s.	,,
Dutch whites	80s. to 100s.	,,

COUNTRY POTATO MARKETS.—YORK, Feb. 13: Potatoes sell at 12d. per peck, and 3s. 4d. to 3s. 6d. per bushel. LEEDS, Feb. 16: A fair show of potatoes, which sold at 13d. to 13½d. per 21lbs. wholesale, and 11d. to 15d. retail. SELBY, Feb. 15: Potatoes, 9d. to 10d. per stone. RICHMOND, Feb. 13: Potatoes, 4s. per bushel. SHEFFIELD, Feb. 16: Potatoes sell at 10s. to 16s. per load of 18 stones. MANCHESTER, Feb. 18: Potatoes, 11s. to 18s. per 252lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland	128 to	134	Cheshire	66	76
Kiel	126	130	Cheddar	72	82
Dorset	116	130	Double Gloucester	58	68
Carlow	104	120	HAMS:		
Waterford	—	94	York	80	90
Cork,	—	114	Westmoreland	80	90
Limerick	90	100	Irish	74	86
Sligo	104	112	BACON: Wiltshire, dried	58	62
FRESH, per dozen..13s. 0d. to 16s. 0d.			Irish, green	50	56

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, Feb. 21.—Since our last report, there has been a moderate inquiry for fine short wools, at full quotations. In all other kinds, the supply of which is only moderate, only a limited business is doing on former terms. For export to the continent nothing is doing.

BRADFORD WOOL MARKET (Thursday).—There has been a tone of quietness in our market during the week, and little business has been done. Spinners having supplied their immediate necessities, pause at the advanced prices now asked. For noils and brokes there continues a fair demand, and prices are firm. Yarns: The export houses continue to buy up anything offering "under the market," but as yet are not prepared to pay the advance now sought, and the spinners, from the difficulties in the way of buying wool, are very stiff in price. Cotton yarns are dearer. Pieces: There has been a fair attendance of merchants, but not much business has been done. Several foreign buyers are over, but their purchases are chiefly confined to fancy goods.

LEEDS (ENGLISH AND FOREIGN), Feb. 19.—The demand for English wool has somewhat diminished, whilst that for colonial has not fallen off. There has been a little improvement in the demand for low foreign, and prices are without alteration.

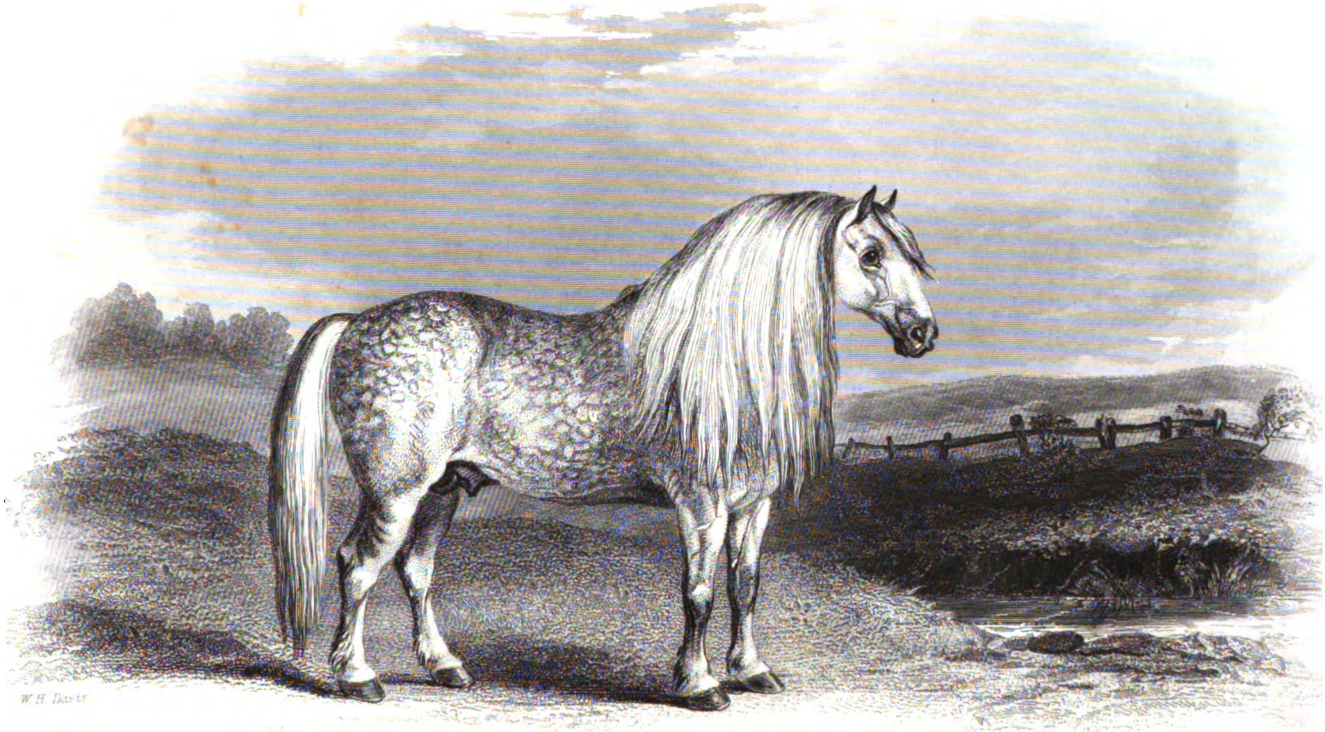
LIVERPOOL WOOL MARKET, FEB. 20.

SCOTCH WOOL.—There continues to be a moderate demand for Laid Highland, but consumers buy still only for immediate wants. White Highland is still inquired for, but wanted at very low prices, which holders are not inclined to meet. Cheviots and crossed of a good class are in fair demand, but only in small parcels to supply immediate want

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs.	11	6 to	12	6
White Highland do	15	0	16	0
Laid Crossed do..unwashed	14	0	15	0
Do. do..washed	15	0	16	0
Laid Cheviot do..unwashed	15	6	17	0
Do. do..washed	18	0	20	0
White Cheviot do..washed	30	0	33	0

FOREIGN.—There is now a decidedly better feeling in the trade, and there are a few inquiries, and business doing to good extent, particularly for fine wools: low kinds move more slowly, but all have an upward tendency.

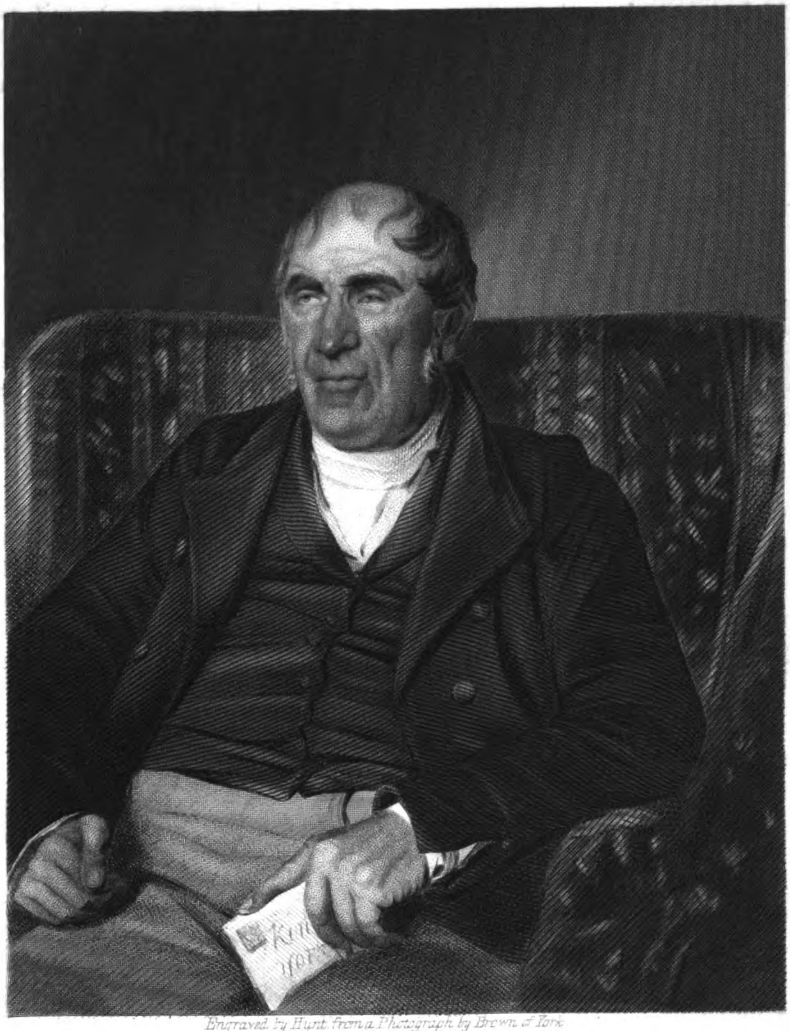
Printed by Rogerson and Tuxford, 246, Strand, London.



Matchless,

A Lincolnshire Cart Stallion, the Property of M.r [illegible] Esq.re of [illegible] Hill, [illegible]
for which the First Prize of £30 was awarded at the Salisbury Meeting of the R.A.S. of England July 1857

London Published by Rogerson & Tuxford 246 Strand 185[illegible]



Engraved by Hunt from a Photograph by Brown of York

Mr. Thomas Kirby
of York.
Born August 1772 _ Died February 21st 1858.

[illegible]

THE FARMER'S MAGAZINE.

APRIL, 1858.

PLATE I.

MATCHLESS;

A LINCOLN CART STALLION, THE PROPERTY OF MR. T. B. T. HILDYARD, OF FLINTHAM HALL, NEWARK.

This horse took the first prize of 30 sovs., as the best of all the stallions for agricultural purposes, at the Salisbury Meeting of the Royal Agricultural Society of England. He was entered and shown at Chelmsford the year previous, but drafted out, as it was said, from not being a good mover. His action since then has been wonderfully improved, and certainly at Salisbury there was not a horse in his class at all equal to him in his paces. He stepped as light and lively as a pony. Matchless has, however, other strong recommendations—a splendid head, neck, and shoulders, good old-fashioned quarters, and extraordinary size and substance. His legs, perhaps, are not quite so clean as they might be. But the greatest of all his attractions, to the common run of sight-seers, is a most beautiful mane, fine in quality, and extraordinary for its length. As a show horse it certainly gave him a most imposing appearance; and as a picturesque noble-looking animal, the Suffolks and other mere utilitarians had no chance with him.

Matchless, bred by Mr. Haytoe, of Simperingham Fen, near Folkingham, in 1851, is by the King of the County, out of a Champion mare.

PLATE II.

THE LATE MR. THOMAS KIRBY, OF YORK.

This well-known dealer and sportsman, whose name has for nearly sixty years been connected with English stock, was born at Osbaldwick, near York, in the August of 1770. As he was born and brought up a Catholic, the parish register contains no entry of his birth, and owing to the lapse of years, he has forgotten the exact date. From his very boyhood, "the current of his being set to" horses; and when he was barely 21, he made his first voyage to Russia in charge of a cargo of them, and entered the service of Count Poltrowsky, who had upwards of 100 brood mares in his paddocks. For a long series of years his life consisted in perpetual Russian voyages, sometimes twice in a summer, and occasionally with two ship-loads of horses. His two sons as well as himself had once a very narrow escape from being "washed away in the flood" at St. Petersburgh, when every horse but one in his stable perished, and that was floated into a sort of garret, from whence its exit was of the most precarious kind. So great was the favour with which the Grand Dukes regarded him, that one of them entrusted him to smuggle over some English porter, and he was wont to carry it by a bottle at a time to the palace, when he went ostensibly to chat with them about horses. On one occasion the cork came out with a rush, and if the sentinel had not good-naturedly accepted his explanation, as to its being "frisky beer," he would, as the Grand Duke laughingly told him, have been sent off for a certainty to Siberia, for a season's wholesome meditation on "Barclay and Perkin's entire."

Orville was the first blood horse he ever purchased, 2,000 gs. being the price, and he proved a most successful venture. Lottery, whom he sold for £1,600, to go to France, was another immense favourite. Bourbon also came into his hands from Lord George Cavendish, for 1,100 gs., Brutandorf for 500 gs., Muley Moloch for 1,500 gs., St. Giles for 1,000 gs. (sold to the Americans for just the same price), General Chasse for 2,250 gs., Van Tromp for 2,000 gs., and Lanercost for 3,000 gs. Otterington's price was 800 gs., and he put him by for a year, and then finding his form was gone, sold him to Lord Jersey and Sir John Shelley, in whose stable he broke his thigh. He also purchased Phœnix from his lordship, and sold him to Mr. Ferguson, of Harker Lodge, near Carlisle; and it was to Lord Jersey that he effected his most successful sale of a yearling by Lottery out of Tambourine for 800 gs. His prices for yearlings seldom exceeded £200, and he generally sold the produce of his five mares at Doncaster. In his hey-day he engaged them pretty deeply, but he was very much sickened of breeding for the turf by the difficulties he encountered in making the vendees pay up the forfeits if the purchases turned out badly, or the contingencies when they won. Hernandez, whom he sold into France with Lanercost, was his last blood-sire purchased.

Mr. Kirby died at York of old age, on Sunday the 28th of last February. Two sons by his first marriage survive him; and about fourteen or fifteen years ago he had married the widow of Mr. Sykes, the well-known trainer. *The Post and the Paddock* will speak further to the adventures of this old English worthy, especially in his dealings with the Emperor of all the Russias.

BARLEY.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

In this the time of barley sowing, at which we are again arrived, we can hardly direct our attention to a more useful agricultural theme. It will be to our advantage in several ways if we spend an April evening in such an enquiry. This will be the more practically useful since there are now several eminent chemists who have lately published the results of their valuable and most laborious investigations on the barley plant. These true friends of their country have examined, not only the produce of barley grown on the same soil for a series of seasons (both unmanured, and also manured with various fertilizers), but they have extended their researches to the varying composition of the seed of barley produced on different soils. It will, happily for the better understanding of our subject, be unnecessary to do more than epitomise the invaluable matter of reports, which ever and anon almost seem intended by their cloudy verbiage to test the farmer's ability in deep diggings.

The reader will, in the paper to which I am about to refer, find abundant materials of the highest practical value. He will ever, in commencing such studies, feel assured that although in the majority of instances the chemist's labours elucidate the correctness of long-established practices; yet in others they shadow forth new objects for the agricultural student's cautious trials; and, in any case, he will not forget the great truth, that although we have long been steadily increasing our knowledge of the habits of barley, yet that there are many questions, with regard to this plant, that yet remain to be explained—mysteries, which when hereafter made clear, will probably give rise to other equally valuable and interesting practical researches.

The growth of barley on the same land for a series of years is an important question, which has for several years past occupied the attention of Messrs. J. B. Lawes and Gilbert "*Jour. Roy. Ag. So.*" vol. xviii, p. 454).

They set apart for these peculiar trials, which commenced in 1852, about five acres of ground at Rothamsted, in Hertfordshire. These were divided into nearly square plots, of about one-fifth of an acre each. The land had grown clover in 1849, wheat in 1850, and barley dressed with sulphate of ammonia in 1851. It was, therefore, as the reporters remark, "in a somewhat exhausted condition, as far as the after-growth of grain was concerned, and it was hence in a suitable state for testing the effects of different manures on the barley crop." In these trials two plots, one at either of the experimental land, were left unmanured, and it is the mean result of these that is given in the subsequent little tables.

The farm-yard dung employed was from the open yard, and not from highly-fed animals. The "mixed alkalies" comprised per acre:

300 lbs. of sulphate of potash.
200 lbs. of sulphate of soda.
100 lbs. of sulphate of magnesia.

The superphosphate of lime was composed per acre of

200 lbs. of calcined bone-dust.
150 lbs. of sulphuric acid (sp. grav. 1.7.

The "mixed minerals" consisted of a mixture of the superphosphate and the "mixed alkalies." The seed, the Chevalier, was always *drilled* at the rate of 2½ bushels per acre in 1852 and 1853, and 7 pecks per acre in 1854-5-6 and '7.

In the following report the produce is given in bushels and pecks. First, then, the produce of the soil entirel yunmanured was,

1852.	1853.	1854.	1855.	1856.	1857.
27 3½	26 0	35 0	33 1	14 1	29 1

Annual average per acre 27 bushels 3 pecks.

The plots with mineral manures only yielded as follows :

	Mixed Alkalies.		Superphosphate of Lime.		Superphosphate and Mixed Alkalies.	
	Bush.	Pecks.	Bush.	Pecks.	Bush.	Peck
1852..........	26	0	28	2	32	3
1853..........	27	2	33	2	35	2
1854..........	36	2	40	2	42	0
1855..........	34	3	36	1	37	0
1856..........	16	2	17	3	19	3
1857..........	32	0	33	1	39	3
Annual average per acre	28	3	31	2	34	2

The plots with nitrogen per acre equal to about 50 lbs. ammonia, with and without direct mineral manures, yielded as follows :

	275 lbs. of Nitrate of Soda.		100 lbs. each of Sulphate and Muriate of Ammonia.	
	Bush.	Pecks.	Bush.	Pecks.
1852............	0	0	36	3
1853............	34	1	38	2
1854............	49	1	47	3
1855............	50	0	44	2
1856............	28	2	25	0
1857............	47	3	38	3
Annual average per acre	42	0	38	2

	100 lbs. each Sulphate and Muriate of Ammonia and "Mixed Alkalies."		100 lbs. each Sulphate and Muriate of Ammonia and Superphosphate of Lime.		100 lbs. each of Sulphate and Muriate of Ammonia Superphosphate & Mixed Alkalies.	
	Bush.	Pecks.	Bush.	Pecks.	Bush.	Pecks.
1852..........	36	0	38	2	40	3
1853..........	36	2	40	0	38	1
1854..........	60	0	60	2	60	2
1855..........	44	2	47	3	48	1
1856..........	28	1	29	0	33	3
1857..........	42	1	56	2	57	1
Annual average per acre	39	2	45	2	46	1

The next question examined by Messrs. Lawes and Gilbert was the effect produced by doubling the amount of nitrogen applied in the last-described series of trials. 100 lbs. per acre of ammonia were therefore employed in the following experiments, and with results given in the next table.

	550 lbs. of Nitrate of Soda.		200 lbs. of Sulphate and Muriate of Ammonia.		2,000 lbs. of Rape-cake.	
	Bush.	Pecks	Bush.	Pecks.	Bush.	Pecks.
1852..........	0	0	44	2	39	0
1853..........	53	1	40	3	39	0
1854..........	37	0	56	2½	60	3
1855..........	49	1	48	0¼	48	2
1856..........	42	0	36	1	36	3
1857..........	58	0	49	3¼	64	0
Annual average per acre	47	3	46	0	48	0

	200 lbs. each Sulphate and Muriate of Ammonia and "Mixed Alkalies.		200 lbs. each Sulphate and Muriate of Ammonia and Superphosphate of Lime.		200 lbs. each of Muriate and Sulphate of Ammonia, Superphosphate and Mixed Alkalies.	
	Bush.	Pecks.	Bush.	Pecks.	Bush.	Pecks.
1832...........	41	3	43	3	45	0
1853...........	41	1	42	1	44	2
1854...........	51	2	63	1	62	3
1855...........	47	1	50	1	49	2
1856...........	25	1	31	2	37	2
1857...........	49	3	66	2	64	3
Annual average per acre	42	3	42	·2	50	3

	2000 lbs. of Rape-cake and Mixed Alkalies.		2000 lbs. of Rape-cake and Superphosphate.		2000 lbs. of Rape-cake & Superphosphate, and Mixed Alkalies.	
	Bush.	Pecks.	Bush.	Pecks.	Bush.	Pecks.
1852..........	33	2	36	2	38	0
1853..........	35	1	36	0¾	40	0¾
1854..........	56	2	60	2¾	60	1
1855..........	48	3¾	53	1	51	3
1856..........	32	2½	37	0½	35	1½
1857..........	60	1	62	1¼	62	1
Annual average per acre	44	3	47	2	48	0

In studying these very valuable results, the farmer will not fail to remark the great influence of different *seasons* in modifying the profitable results obtained by different dressings. Our reporters allude to this, when they observe that from the pervading influence of season, by which the produce may be double one year that of another, even with the same set of conditions supplied by the farmer, and which moreover, when unfavourable, the crop most highly manured suffers most, it results that the amount of produce obtained for a given outlay in manure may be only half as much in some seasons as in others. Then, again, it is evident that some of these nitrogenous fertilizers were applied in excessive proportions. The reporters, indeed, observe, "The unmanured, and the only *mineral* manured portions, as a rule, stood up till the time of cutting. The crops with nitrogen equal to 50 lbs. of ammonia per acre were generally more or less laid, as were also those grown by farmyard manure. Those having nitrogen equal to 100 lbs. or more of ammonia per acre were invariably laid, and in every year excepting in 1857 very much, and injuriously so, the crops being too heavy to bear any moderate amount of rain about or after the time of heading." The effect of these manures in influencing the *period of ripening* is also a material consideration. The "mixed alkalies" it seems, whether used alone, or in admixture with nitrogenous manures, invariably somewhat retarded the ripening. Superphosphate of lime, on the contrary, whether used alone or in combination with other manures, always promoted early ripening. The effect, Messrs. Lawes and Gilbert add, was most striking. So much so, indeed, that latterly it has been thought desirable to cut the crops at different times, as they came ripe; those dressed with superphosphate of lime, or with farmyard manure, coming to the scythe more than a week earlier than the others. It will presently be seen, that the superphosphate had a marked effect on the *quantity* of produce also, and especially on the tendency to corn.

The general conclusions at which these scientific cultivators arrive, will accord pretty well with those of the farmers who carefully study the above tabular statements, viz., 1. That the use of exclusively mineral manures, and especially those containing phosphoric acid, annually increase the produce of barley. 2. That with barley grown continuously on the same land, nitrogenous manures have a much more striking effect than mineral manures. 3. That by the annual supply of nitrogenous manures alone (nitrate of soda or ammoniacal salts) larger successive crops, both of corn and straw, were in these experiments obtained, than by the annual use of fourteen tons of farmyard manure. 4. That within certain limits, even on the comparatively exhausted soil employed in these experiments, nitrate of soda, ammoniacal salts, and rapecake, all increase the produce of barley approximately in proportion to the amounts of nitrogen they respectively supplied. 5. That the effect of a given amount of nitrogen, if not excessive, is considerably increased by the addition of certain mineral manures, especially those containing phosphates.

The composition of barley (examined chiefly with regard to its nutritive properties) grown on different soils, is an interesting branch of the inquiry that has recently engaged the attention of Professor Anderson (*Trans. High. Soc.*, 1858, *p.* 287). He tells his reader the objects which he chiefly had in view in instituting his experiments, when he observes, that every one who has directed even a limited attention to agricultural chemistry must be familiar with the subdivision of the nutritive principles existing in plants, and required for the food of animals, into two great groups—of albuminous and respiratory principles; the former serving to produce the flesh or muscular fibre of the animals, and the latter being partly consumed in the system in the process of respiration for the purpose of maintaining the animal heat, and partly accumulated as fat to form a reserve against the temporary deprivation of food from want or disease.

A few of the mean results obtained by Dr. Anderson will be found in the succeeding tables:—

The water per cent. in Chevalier barley was, in the specimens examined—

From a gravelly soil (57 lbs. a bushel) ..	14·52
,, a rich, dark loam (56 lbs. do.) ..	14·82
,, a red loam (54 lbs. do.)	14·85
,, a sharp gravel (55¼ lbs. do.)	12·76
,, a light sandy soil (55 lbs. do.) ..	14·03

The albuminous compounds in the same specimens of barley were, in that from

A gravelly soil	7 09
A rich dark loam	6 91
A red loam	10·30
A sharp gravel	8·22
A light sandy soil	8·10

The amount per cent. of respiratory compounds in these specimens were, in that from

A gravelly soil	66·43
A rich dark loam	66·57
A red loam	65·75
A sharp gravel	70·57
A light sandy soil	65·15

The proportion per cent. of woody fibre and ash in these were as follows, viz., from

	Fibre.	Ash.
A gravelly soil	8·28	3·68
A rich dark loam	8·57	3·13
A red loam	8·00	1·10
A sharp gravel	5·94	2·51
A light sandy soil	10·28	2·39

From three varieties of common barley he obtained the following results:—In this table, column I. gives the composition of a specimen of barley (weighing 55¼ lbs. per bushel), grown on a thin clay soil; II. that of the same kind of barley (53½ lbs. per bushel) from a sandy soil.

	I.	II.
Water	14·60	12·47
Albuminous compounds	8·97	9·39
Respiratory principles ..	64·14	70·33
Fibre	11·10	5·25
Ash	1·19	2·56

In comparing the value of barley with other grain, as Dr. Anderson concludes, it is obvious that it bears a high nutritive value. In the proportion of albuminous compounds it stands on a level with wheat grown in this country, but naturally from the presence of the husk it is below it in the quantity of respiratory elements; the relative importance of these two groups, however, in a nutritive point of view, has not yet been clearly decided.

These chemical examinations of the composition of barley, and of the effect of various artificial dressings, I repeat, will well repay the farmers for their most careful consideration. The reader should, indeed, ever banish from his mind any lingering suspicion that science has already achieved all the aid that can be rendered to the cultivator of the soil. Let us all rather feel well assured of one certain fact, that many a mystery in the phenomena of vegetation is yet to be explained by the chemical philosopher, that will, perhaps, to the end of time, steadily add to the power and stimulate the efforts of still more enlightened agriculturists than even those of our age.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held on Wednesday, the 24th of February: present, Mr. Raymond Barker, Vice-President, in the Chair; Mr. George Raymond Barker; Mr. Bosanquet; Dr. Camps; Mr. T. T. Clark; Mr. Dent, M.P.; Rev. L. Vernon Harcourt; Mr. Fisher Hobbs; Rev. James Linton; Mr. Thomas Scott; Mr. Clark Thornhill; and M. de Trehonnais.

Communications were received: 1. From the Earl of Clarendon, enclosing dispatches from Captain Vansittart of H.M.S. Magicienne, reporting, as the result of a search made during a recent visit to the Gallapagos Islands, that deposits of guano do not exist there in sufficient quantities for practical purposes. 2. From Sir Charles Lyell, a collection of works, received by him from various sources, having a bearing more or less immediate on agricultural science and practice. 3. From M. Andreas von Kiss, of Pesth, desiring the opinion of the Council on a question of exhaustion of land underlet by him to peasants, and of which the Austrian laws took no cognisance. 4. From Mr. Murray (of Albemarle-street), requesting on the part of the Baron von Rosenkrone, of Bergen, information for a committee appointed by the Norwegian Government on the best system of inclosure to be adopted for estates in that country.

The Council adjourned to their monthly meeting on the 3rd of March.

A Monthly Council was held on Wednesday, the 3rd of March: present—Lord Berners, President, in the Chair; Lord Feversham, Lord Portman, Hon. Colonel Wood, Hon. W. G. Cavendish, M.P., Sir Watkin Williams Wynn, Bt., M.P., Sir Chas. Gould Morgan, Bt., Sir Archibald Keppel Macdonald, Bart., Mr. Raymond Barker, Mr. Barnett, Mr. Barthropp, Mr. Brandreth, Mr. Caldwell, Colonel Challoner, Mr. Druce, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. James Howard, Mr. Hudson (Castleacre), Mr. Jonas, Mr. Lawrence, Mr. Millward, Mr. Paget, M.P., Mr. Pain, Mr. Shuttleworth, Professor Simonds, Mr. Thompson, Mr. Torr, Mr. Vyner, and Mr. Jonas Webb.

Thomas Mills, Esq., of Tolmers, Hertfordshire, was elected a Governor of the Society.

The following new members were elected:—

Body, Richard Barnard, Hyde End, Shirfield, Reading.
Bromley, James, Cockerham, Lancaster.
Buckworth, Theophilus Russell, Cochley-clay Hall, Swaffham, Norfolk.
Cotton, Lt.-Col. Hon. Wellington H. S., Cherry Hill, Malpas.
Davies, Robert Craddock (Banker), 187, Shoreditch, London.
Fanton, Edmund, Hill Farm, Torrington, Devon.
Hagen, Jacob, Roplay, Alresford, Hampshire.
Hall, Thomas, Duke's Oak, Brereton, Congleton.
Hodge, Henry, St. Levan, Pensance, Cornwall.
Lee, Thomas, Brown Edge, Congleton, Cheshire.
Lichfield, Earl of, Shugborough, Staffordshire.
Perry, Sir Thomas Erskine, Bart., West Court, Berkshire.
Simonds, Thomas, Marske, Redcar, Yorkshire.
Seals, Charles William, Leigh-Delamere, Chippenham.
Smith, John, of Sevenhampton, Gloucestershire.
Starmer, Charles, Hogsthorpe Rectory, Alford, Lincolnshire.
Taylor, William, Pool House, Groby, Leicestershire.
Walker, James, Bigbrook Hall, Kidlington, Oxon.
Watney, Drniel, Reigate, Surrey.
Wheeler, E., Kyrewood House, Tenbury, Gloucestershire.

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the monthly report on the accounts; from which it appeared that the current cash-balance in the hands of the bankers was £612.

Journal.—Mr. Thompson, Chairman of the Journal Committee, reported recommendations: (1.) That Mr. Miles's article in the last Journal on horse-shoeing should be reprinted in a separate form, and sold at 6d. each copy to the public, and at the rate of 2s. 6d. per dozen to members of the Society. (2.) That a bound copy of the Journal should be presented to the library of the Harpenden Laboratory, in acknowledgment of the numerous and valuable contributions made by Mr. Lawes to the Society's Journal, and of the eminent services conferred by him on British Agriculture. On the motion of Mr. Jonas, seconded by Mr. Torr, the discussion of the questions of the amount of salary to be given to a paid editor of the Journal, and the person or persons who should be appointed to discharge the duties of that office, was postponed till the next monthly meeting.

Lectures on Milk.—Mr. Raymond Barker, Chairman of the Veterinary Committee, reported that Prof. Simonds, the Veterinary Inspector of the Society, had stated to the committee that his paper for the next Journal, embodying the substance of his lectures delivered before the members on the Anatomy and Physiology of Milk-secretion, was far advanced towards completion, and would be delivered to the Journal Committee by the 15th of next month.

Prize Essays. — Numerous essays and reports, competing for the prizes offered this year by the Society, were received.

Trustee.—On the motion of Mr, Fisher Hobbs, seconded by Mr. Milward, Mr. Thompson, of Kirby Hall, and Chairman of the Journal Committee, was unanimously elected one of the trustees of the Society, to supply the vacancy created by the decease of Earl Spencer.

Members of Council.—On the motion of Mr. Milward, seconded by Mr. Torr, Mr. Humberston, of Mollington, and Mayor of Chester, was unanimously elected one of the general Members of Council, to supply the vacancy created by the decease of Mr. Simpson; and on the motion of Mr. Fisher Hobbs, seconded by the Hon. Colonel Hood, Mr. Francis Sherborne, of Bedfont, Middlesex, was elected one of the general Members of Council, to supply the vacancy created by the decease of Mr. Stephen Mills.

Chester Meeting.—Lord Portman, Chairman of the General Chester Committee, reported recommendations on the acceptance of Mr. Manning's contract for the works at Chester, and of the Mayor of Chester's arrangements for a dinner for 500 persons in the Music Hall; also on the accommodation of the Judges, and the sale of substantial refreshments at a cheap rate to the labouring classes during the period of the meeting. The Committee also recommended that a Special Committee should be appointed to report, before the selection of the place of meeting for next year, the best arrangements to be made in reference generally to the show-yard works.

On the motion of Mr. Fisher Hobbs, seconded by Mr. Paine, a Special Committee of Show-yard Works was appointed.

Mr. Barnett's suggestion that application should be made for the refusal of extra land, should such be required, for the trial of the steam-cultivators at Chester, was adopted.

Mr. Hudson (of Castleacre) suggested that the general question of the Society's purchasing a suitable pavilion, to be retained as its own property, for the purpose of the great dinner of the Society at its successive country meetings, should be referred to the special committee on show-yard works.

Additional Special Prizes offered by the Chester Local Committee were accepted, and ordered to be included in the Prize-sheets of the Society.

On the motion of Mr. Jonas, seconded by Lord Feversham, Mr. Milward, of Thurgarton Priory, was unanimously elected one of the stewards of the cattle-yard at the country meetings of the Society.

On the motion of Lord Portman, seconded by Lord Feversham, it was decided that the Stewards of the Stock-yard be requested to report to the Council, at a Special Council to be held as soon as possible after the entry of stock, the *number* of Judges required for stock.

Metropolitan Meeting.—On the motion of Mr. Brandreth Gibbs, seconded by Mr. Fisher Hobbs, the Council decided that it was desirable that the Society should hold a Metropolitan Show, provided a suitable site could be obtained; and on the motion of Lord Portman, seconded by Lord Feversham, that the Show should not be held until after the year 1860, when the circuit of districts for the country meetings of the Society will have been completed, but in the first year afterwards that might be found practicable. The arrangements connected with this subject were referred to the Metropolitan Show Committee.

Dates of Entry.—Lord Feversham adverted to a misprint in the last part of the *Journal*, which might mislead persons who were not aware of the standing dates at which entries had for many years been made for the shows at the country meetings. It occurred in the last page of the appendix, where, under the head of "Dates of Entry," Live Stock had been misprinted for Implements.

Card of Meetings, and Admission of Reporters.—The Council did not adopt Mr. Frere's suggestion for a "Card of Meetings," and they declined to grant Mr. Morton's application, on the behalf of the Proprietors of the *Gardener's Chronicle*, for the admission of Reporters.

Steam Cultivator.—A lithographed circular addressed to the Council, and requiring special information on the subject of the Society's prize for a Steam Cultivator, was laid on the table; and the Council ordered that Mr. Collinson Hall, Mr. Fowler, Mr. Burrell, and Mr. Williams, by whom it was signed, should be referred to the printed rules for trial, to which the Council would adhere.

The Council adjourned to their weekly meeting, on March 10.

A Weekly Council was held on Wednesday, the 10th of March; present: Mr. Raymond Barker, V. P. (in the chair), Mr. Dod, M.P., Mr. Gatty, Mr. Brandreth Gibbs, Rev. L. Vernon Harcourt, Mr. Fisher Hobbs, Mr. Allen Ransome, Mr. Thomas Scott, Mr. P. Simpson, Professor Simonds, and Mr. George Wood.

Mr. Bailey Denton made an application in reference to his intended draining operations abroad.—Mr. Eddleston alleged his discovery of a cure for Pleuro-pneumonia and Potato disease, and his willingness to communicate it to the Council under certain terms of remuneration.—Mr. Spencer Trower, of Stansteadbury, presented a foetal foal, 46 days in embryo, taken from a mare 21 years old (a specimen which Professor Simonds considered to be interesting as showing the early development of the fœtus).—The Committee of Council on Education presented copies of an Almanac prepared by the Science and Art department. The Rt. Hon. T. F. Kennedy presented a copy of Mr. Spence's work on the practical consideration of the Coal, Smoke, and Sewage questions.

Adjourned to March 17.

A Weekly Council was held on the 17th of March: present, Lord Berners (President) in the chair; Mr. Alcock, M.P., Mr. Fuller Baines, Mr. Raymond Barker, Mr. Body, Mr. Caird, M.P., Mr. Fisher Hobbs, Mr. Holland, M.P., Mr. Langston, M.P., Mr. Majendie, Mr. T. Scott, Mr. Vyner, Mr. Burch Western, and Mr. Sutton Western, M.P.

Communications were received—1. From Mr. Stallard, of Redmarley, Gloucestershire, suggesting a prize to be offered by the Society, for the best-constructed moveable shade for sheep during the hot months of the year, especially on the red warm sandy soils, for the purpose not only of comfort to the animals themselves, but of preventing their damaging the under part of fences, and their losing flesh during the period of hot weather. The President had found simple awnings constructed of four upright poles, open at the sides, but covered at the top with faggots or brushwood, answer the purpose very well. 2. From Mr. Alcock, M.P., suggesting that the Society should offer a prize of £100 for the largest amount in value of agricultural produce (serving as food for man or beast), in one year, from a single acre of land, provided a fair profit be shown by the cultivator; the application for the prize to be accompanied by a detailed account of the cost, value of the crop, and mode of cultivation, and notice given to the Secretary by any person intending to compete.—These communications were referred to the Journal Committee.

Adjourned to March 24.

NOVEL APPLICATION OF HORSE-POWER.—The *Montrose Standard* directs attention to the "performance of a new method of applying horse-power to drive machinery, which Major Rennie Tailyour, of Borrowfield, has introduced at his steading at Newmanswalls. The apparatus, which is very simple in its design, differs entirely from the mode hitherto in use. Instead of moving round in a circle, and drawing the end of a lever attached to an upright shaft, the horse remains stationary, fastened in a stall, and the flooring on which he stands passes backwards under him, as he appears to step forward. The flooring consists of a series of stout boards, lying across the stall, and resting on and made fast to two endless chains stretched round a couple of drums, one at the head and the other at the foot of the stall, thus forming, as it were, a firm but flexible belt, on the upper surface of which, as on a moveable floor, the horse stands. The drum at the head of the stall being somewhat more elevated than at the foot, this moveable floor is slightly inclined; and the weight of the horse causes it to descend towards the lower drum, carrying the horse backward along with it. As, however, the halter by which he is tied in the stall obliges the horse to maintain his position, he is compelled to step forward continuously as the floor recedes under him; and the revolution of the drums thus produced drives whatever machinery it is intended to propel. At Newmanswalls it is successfully applied to driving a thrashing machine, a chaff-cutter, and a machine for bruising oats. No driving or watching is required; and we were informed that a horse might work at this species of treadmill without distress or fatigue for eight hours." [The practice is common throughout the United States and Canada. In fact, the wood at every minor railway station is sawn in this manner.]

THE AGRICULTURE OF FRANCE.

At the height of what might have been so delicate a crisis, it becomes us to be especially careful as to what we say of our neighbours. With the notoriety of the Fleet-street Forum by way of a warning, we should be more than usually nice in our parts of speech. There should not be a phrase to quarrel with, or even a word to cavil at. It is difficult, then, to imagine an orator vehement in his denunciation of what is going on over the other side of the Channel—how the higher classes in France are bought and sold with honours—how the monied mén are rotten to the core—how the improvements in Paris are made at an unfair expense to the country—how those who would do good have no power—and so on. And yet it has been our fate to hear lately a great deal in this strain; not, however, at a gin-and-water parliament in the City, nor from the over-excited aspirant of a debating club. On the contrary, no less august a body than the Society of Arts gave its countenance to the occasion. Further than this, the reader has only to associate the staid decorum of its discussion-room with the wild Irishman or headlong patriot who rejoiced in so unexpected an opportunity of having his "fling."

This would make the offence complete; but luckily the Society is saved the more serious part of the charge. It is no wild Irishman who talks like this; no ferocious Cuffey bound on re-organizing, not merely his own country, but all the world over. For the very reverse, take a plump, really contented-looking gentleman, who speaks with an accent so decidedly foreign that it is difficult to follow him—who announces himself as a landed proprieter in Normandy—and who, in fact, is a Frenchman, just giving his opinion on the political economy of his own country. The Society of Arts is inexpressibly relieved, and the "reading" proceeds with far more equanimity than had Brian Born or some home-bred Hampden been in possession of the chair.

Strangely enough, the text-word of this address was Agriculture. Now if there is one thing more than another that we Englishmen should be inclined to regard with a feeling of satisfaction, it is the effort France has lately been making in this way. If there be any one cause that has induced more than another to kindly intercommunication between the two countries, it has assuredly been this desire to improve the cultivation of France. The international shows are still fresh upon our recollections. The manner in which the English were received, and the way in which they endeavoured to return the compliment—the individual courtesies of the Emperor to men distinguished amongst us in the pursuit—His evident sympathy with the art—the prices he gives for stock—the example he is setting in farming—when we come to reflect on all these recent manifestations, one might suppose a glance over the agriculture of France would surely by this time turn to the sunny side of the picture.

Stranger even still, perhaps, there was no one, who by his antecedents stood better recommended to read a paper on French farming than the introducer of this subject. One of the first points in his favour was that he was well known to English farmers; another, that he had a natural taste for the occupation; and, a third, that he is now pursuing it in France. Monsieur Trehonnais was just the man to have made a practical comparison between the cultivation of the two countries. With his intimate knowledge of either, it should have been his peculiar province to have directed the excellence of ours to the wants of his own system. Unfortunately he did not dwell enough upon this very essential matter. The first part of a long address was devoted to the agriculture of France, traced as far as three hundred years back, and of course dependent upon the authorities of those times. The second section, which touched more upon the present condition of the country, partook rather of an essay upon political economy than one directly referring to agriculure. In fact, the subject itself was little more than incidentally touched on, and what was said of it was tinged with something very like, utter despondency.

According to Monsieur Trehonnais, the farming of France is as bad as it possibly can be—worse than it was three hundred years ago. This would appear to be mainly attributable to two grand causes—want of labour, and want of capital. France, be it remembered, is essentially a military nation; and the continual drain of able-bodied men must of course tell upon the cultivation of the country. The two arts never yet flourished together. Monsieur Trehonnais further attributes this scarcity to what he considers the present injudicious centralization in towns. The embellishments of Paris, for example, are made at the expense of agriculture. The 300,000 additional inhabitants of a few years chiefly consist of mechanics and labourers removed from the country. The want of capital naturally follows. He speaks of the amount of treasure lavished on the city—the disproportionate expenditure for public works in Paris compared with the whole of France. The chief cause of this want of means for improving the land—at least, the one generally received as such amongst us—he will not admit. He believes the evil influence consequent on the division of property to be more apparent than real. At the same time he allows that share for share does take place: the daughters receiving an equivalent in money, and the land remaining with the son. Under such a system, it is almost impossible to imagine anything but the soil being continually mortgaged with these "equivalents," and left without a franc for its own improvement. In this country no man now does so badly as the one who just hangs on to his own bit of land. With the small occupier, either owner or tenant, no great progress can be attained; and France is overrun with these small holdings. Monsieur Trehonnais thinks it only right they should be thus limited in accordance with the means of the people. He must remember, however, that nothing can be done without capital, while the greatest bar to its use is the perpetuation of these little properties. Men in such a position can never command it. If we needed any illustration of this, we have only to look to Ireland as it was, and as it is. It is hard to suppose that the agriculture of France can be materially advanced without some more decided action of the law of primogeniture.

Monsieur Trehonnais himself unintentionally supports this view of the case. He will have everything depend upon individual exertion—a sound conclusion enough, although he rather over-impresses it. It strikes but harshly to hear the recent efforts of the Emperor characterized as worse than useless:—"But, I may be asked, has the French Government done nothing to revive agriculture? There is a Minister of Agriculture; there is a large and influential staff of agricultural inspectors; there are innumerable Government model farms, agricultural colleges, breeding establishments, where the best English cattle are kept; there are shows, both local and general; there have even been some called universal and international. We have heard of a vote of £4,000,000 sterling for drainage; there is a bank of *crédit foncier;* very large sums of money are spent from the consolidated funds and from local resources, in liberal prizes and encouragement. Surely all these must have exerted a considerable influence upon French agriculture, and given an extraordinary impetus to its progress."

Surely, at any rate, say his hearers, the effort is a noble one; and if such encouragement does not effect something, it ought to. But what says Monsieur? He answers us with a very terrible simile:—

"We have all heard of—and some of my audience, perhaps, have seen—a strange and somewhat awful experiment performed by means of a galvanic pile upon a corpse. A wire is put in communication with the spinal marrow, and life, movement, and action are restored to the muscles; the corpse will stand erect, open its eyes, move its arms and legs; its livid lips will quiver as if they were going to speak, and to all appearances death has been conquered, and the corpse lives: but only interrupt the mysterious current from the pile, and the lustre of the eyes will vanish, the arm will fall inert, the jaw will hang, the eyelids will close, and the ghastly corpse will fall to the ground, once more a helpless mass, on the verge of decomposition. In like manner the action of the French Government props up a show of activity, a show of vitality, in the French agricultural interest; but it exists only on the surface. Who are those who exhibit at the shows? They are only a few amateur fancy farmers; and the specimens they exhibit very often constitute the totality of the stock they have on their farm, and are by no means a sample of the agriculture of their districts. The farmers, with very few exceptions, are not only not exhibitors, but not even visitors. The schools have been productive of very little good. As farms, they have been lamentable failures, and the peasants point to them as instances of the folly of modern ideas; in fact they do not pay, and as model farms they ought to pay."

And so on. But Monsieur Trehonnais should bear in mind that a whole people do not take to a business like this on the instant. It was some years, even, before our own great agricultural show came to be appreciated, and for many it had to bear up against all kinds of abuse and ridicule. We really believe that, whatever the Emperor may have done for France in other ways, his laudable attempts to advance the agriculture of the country have been both judicious and effective. We may—indeed we must, wait for such a result; but it will come nevertheless.

We could wish to have concurred more fully with the tone of this paper. Somehow or other, however, it was scarcely suited to an English taste, and there was not a speaker who followed Monsieur Trehonnais but that dissented from his deductions and opinions. As these were chiefly friends of his own, this expression of feeling is the more remarkable. The last few years have given many the opportunity of seeing something of French agriculture, as well as of what the Emperor is doing for it.

THE GAME LAWS.

INJURIOUS EFFECTS OF UNDUE PRESERVATION OF GAME ON OUR HOME SUPPLIES.

At a recent meeting of the Milborne St. Andrew Farmers' Club, Mr. Richards opened a discussion on this subject. Mr. H. Fookes in the chair.

Mr. RICHARDS proceeded—Although the circumstance of my bringing before you the subject for our discussion this evening originated from a passing joke, yet permit me to say that I consider it a very grave and important subject, and one which deserves our most serious consideration. I say then, gentlemen, it is an important subject—and why? My answer is, because it involves the question of a most serious loss to the country at large, and a perfectly ruinous one to individuals. You who know what quantities of agricultural produce are annually destroyed by rabbits and hares, will not be surprised to hear me say that my opinion is, it would be possible to show that the preservation of game lessens our home produce to nearly the extent of our importations. I would not have you understand me to say that food to this amount is eaten by rabbits and hares, but that our produce is lessened in one way and another to this extent. I would now proceed to show in what way the preservation of rabbits, hares, and game generally may be said to lessen our produce; to consider the effect, direct and indirect, to individuals, and to the public; and to suggest a means by which an equal amount of sport would be afforded, without the objectionable consequences which now exist in many cases. First, then, in what way is agricultural produce so lessened by the preservation of game? And here I may be met with the objection that rabbits are not game, and therefore it is unfair to consider the damage done by them under this head. To this I would answer that, in preserving game, the increase of rabbits is almost a certain consequence; and although they may not, strictly speaking, constitute game, yet to kill them is an offence punishable under the game laws, and an act which, on the part of a tenant, would displease a game-preserving landlord. It may be said—"Why, it will only take so much to keep a rabbit, and so much a hare, and therefore the consumption cannot be so great." But you do not need to be told by me that it is a case which admits of no such rule of calculation. Could farmers by any means confine these animals, cause them to feed where they would choose, and make them eat their way clean as they go, then it may be possible to arrive at something like a correct estimate of the value of keep. But this you know to be impossible. What, then, are the facts? Take first the swede crop, which, as you are aware, is raised at a heavy outlay, and which, probably, the grower intends as a provision for his sheep in the spring, and on which he may be solely dependent for food at that period. What, then, are his disappointment, inconvenience, and loss, when he finds that instead of twenty tons per acre which he had on his land in November, he has, in the month of March, not more than ten? and, probably, of the ten tons lost, not more than two or three have been eaten, or even less than this, as you well know that when turnips are bitten they decay, and, for one ton actually consumed, five, or even more, may rot in the ground. And now, gentlemen, how shall we estimate the loss arising from such destruction? The answer of some may be, "Why, you lose so many tons of swedes, the market value of which is so much." That I admit is your first *direct* loss; but, where a flock of sheep is kept which have to be fed on that farm, who shall say what the loss may be on that flock? And this is only a mere beginning of injuries; for, if you have but one-half the amount of keep to feed on your land, you leave on that land only one-half the quantity of manure which would have been left had you fed your entire crop. I need scarcely ask you what will be the effect on your next crop? Where hares and rabbits have eaten swedes they will also visit barley; and, as by the loss of so large a portion of your turnip crop you have been unable to leave much manure, your corn crop grows sparingly, and the consequence is that it requires a large breadth to furnish food for these nightly visitors; and at harvest you may make up your mind to be content with, it may be, less than half the crop that you would have had but for the ravages of these vermin. I do not intend to attempt to trace these effects to their end, but I cannot stop yet. I would next inquire, what are the results of a deficient corn crop? Not only are you deprived of your fair returns from this branch of your produce, but the amount of straw is also lessened; consequently you have not the quantity to convert into manure to return to your land again, which you ought to have, and your future crops must suffer. Some may say one good arises from a light crop of barley, which is, that your clover and grasses do better. In some measure this may be true; but, remember, before you reap much benefit from this crop you have to pass through a winter; and I would inquire what is your experience of the effect of incessant close feeding through a winter on a clover crop? I venture to assert that no crop, whether sainfoin, red clover, or any other description of clover, is proof against the continual feeding of a large stock of hares and rabbits, and that consequently the destruction of your clover crop is as certain as that of your corn crop. Your land, in its turn, comes to wheat, and this being an autumn-sown crop gives a long period, at a time when food is scarce, for game to feed on it. And here, too, as you well know, if too closely fed, its destruction is certain; and if not really killed, is so checked by repeated bleeding, that it will not grow until a late period in the spring; and the consequence is that you get scarcely any corn in your straw, and, what little you have, of most inferior quality. Rabbits, as you are aware, feed on and keep down a certain breadth, whereby the injury is perceptible at a glance; whereas hares cut roads in all directions through corn, leaving those roads completely covered with ears of corn; and therefore, unless a close inspection is made, it would almost pass unobserved, but although the damage is less apparent, it is, I believe, greater in amount. You are aware, gentlemen, that all I undertook to do was merely to launch the subject for you, in order that the various members may have an opportunity to express their opinions, and I think what I have said is sufficient for that purpose, as well as to show that the actual destruction by hares and rabbits is very considerable. But it is not to this alone that I attribute the deficiency on our home produce. Consider the many thousands of acres of useful land at this time made available for nothing but for the preservation of game. Look, again, at the additional thousands which, although not actually incumbered and forming preserves, are but very imperfectly cultivated from their contiguity to game preserves. Consider, then, the increased amount which may be grown were all these lands well cultivated and none of the produce consumed, and say whether you do not think that England may be made to feed her own population? Next, then, as to the effects of this destruction. To the individual who suffers the direct loss it is most ruinous. No consideration of rent can compensate for it, and I believe it would not be difficult to trace to this cause the ruin of many a man of capital. There is a maxim, not unfrequently quoted, that "The man who makes two blades grow where only one grew heretofore, is a benefactor to his country." May it not with equal truth be said that he who imposes an obstacle to the full development of the resources of our soil is an enemy to his country? It appears to me that there can be no more genuine source of national wealth than the produce of our soil, particularly as it furnishes the chief necessaries of life; and whether the food for our population be raised on our own soil, or whether a large proportion be purchased in foreign countries, at a cost of many millions sterling per annum, is a question of no small amount to the country at large. I think the farmers of England may say—"Allow us fair scope for the application of our capital, our skill, and our energies, and you shall have little occasion to go to foreign shores for human food." Are we, then, to curtail the rights of our aristocracy to their sports? I would be the last man to make such a proposition, and I am quite sure there are none among you who would not be pleased to show your landlord and his friends a fair amount of sport; and I think this could be done without the present system of game preserving, and at a much less cost to the landlord. I should hope there is enough of principle among the agriculturists of the present day, to entitle them to a little confidence from the owners; and I would say, make every tenant keeper over his own farm; give him at least an unrestricted right to kill rabbits and hares, and you shall find an equal, if not an increased amount of legitimate and fair sport; for every farmer would feel a pride in showing his landlord and his friends good sport; he would take an interest in the preservation of game, whilst he would have it in his power to protect himself from the injuries of the rabbits and hares. He would overlook a little damage done by hares rather than not have enough of them to afford a fair amount of sport. We all know the difference between a voluntary and a compulsory loss; and whilst a man would bear cheerfully with the one, he would feel the other to be a gross injustice. Give a man an interest in the game, and he at once feels responsible for its preservation, and becomes as jealous over it as over his own stock. He would discountenance poaching, and thereby prevent breaches of the law, which sometimes lead to more serious crime. No man has the same influence with the labourer as the master, and no man so likely to know his habits and character; and who can doubt that when a man is suffering severe losses by game, and dares not defend himself against them, nor in any degree participate in the sport of destroying it, he will sometimes shut his eyes to acts of poaching, and that, too, without feeling that he is really countenancing a breach of the law? Gentlemen, I feel I have occupied a full share of your time, although I have but feebly and imperfectly discharged the duty I undertook. Having been bred a practical farmer, my education and early associations have not fitted me either for an author or an orator; but of this you may rest assured, that the little experience I have gained by my intercourse with the world is ever at your service, for I feel that we are linked together by bonds of no common order, our object being not our individual benefit, but the common good of all. When I have heard the remarks of the members present, and should I find their views accord with mine, I shall be prepared to submit a resolution to the meeting.

Mr. DOWDEN said, although he agreed with Mr. Richards' arguments, he was happy to say he did not suffer from an excess of the game nuisance at the present time. The evil had been put down to a great extent, as he was at liberty to kill hares, rabbits, &c., on his farm. He, however, remembered the time when he could have shot one hundred and fifty couple of rabbits in one day. This species of game he regarded as more destructive than any other; as, wherever they assembled in numbers, they poisoned the soil, and ruined everything that came after them.

The CHAIRMAN (Mr. H. Fookes) could not agree with Mr. Richards as to the loss inflicted by the preservation of game in England. No doubt, however, rabbits did a great deal of mischief to the crops and herbage. He considered that the farmer was a better preserver of game than the gamekeeper; for the privilege to shoot gave him as much interest in preserving it as any other man. He had not much confidence in gamekeepers generally, though there might be some respectable men amongst them.

A conversation took place respecting the means adopted to snare rabbits by traps, so as not to hazard the lives of other game. The Chairman expressed an opinion that this *sine qua non* was altogether delusive, and said that the same trap which caught rabbits could snare all other game.

Mr. RICHARDS, in reply, said he thought more members of the club would have expressed their opinions upon the subject. With regard to the Chairman's comment on his remark as to the quantity of produce consumed in England by game, he would reply that the damage done in this county was less than in any other. In other counties the damage was infinitely greater; the game being more strictly preserved. In many instances also it was deemed disrespectful for a tenant to make complaint to his landlord against a gamekeeper, and the consequence was that there were no greater poachers anywhere than gamekeepers. Mr. Richards then submitted the following resolution to the approval of the club: Resolved—"That it is the opinion of this club, that the manner in which game is preserved in some districts is most objectionable, inasmuch as it impedes the advancement of agriculture, subjects the tenant farmer to serious losses and inconvenience, and in many cases is the cause of disagreement and ill-feeling between landlord and tenant. And whilst we do not wish a repeal of the game laws, or in any way to infringe the rights of property, we consider that if tenants were allowed the right of sporting over their own farms, to the extent of killing hares and rabbits, they would insure to the landlord an equal amount of sport to that which he now enjoys, and in most cases the chief cause of complaint would be removed."

The CHAIRMAN said he fully coincided with the resolution, and on being put to the meeting, it was carried unanimously.

Mr. ROBT. FOOKES moved, and Mr. DALE seconded, a vote of thanks to Mr. Richards.

MEETING OF HOP-PLANTERS FOR THE ABOLITION OF THE DUTY.

On Friday, March 18, a large and highly influential meeting of hop-planters and others was held at the Sussex Hotel, Tunbridge Wells, for the purpose of promoting the repeal of the excise duty on hops. There were between 300 and 400 present.

On the motion of Mr. Moses Body, chairman of the committee, Mr. Rutley (Wrotham) was called to preside.

The **Chairman** said it would be his first duty to inform them that the meeting had been convened by bills drawn up by the committee appointed at the Robertsbridge meeting. As to the object the society had in view, he could only repeat the advice which he gave the planters at the Robertsbridge meeting, namely, that if they wished to secure the public attention and interest in their cause, they must proceed boldly upon a broad principle, and persevere consistently in one course. It was a matter of very great congratulation that so many persons had assembled. He took the circumstance as unmistakable evidence of the wide-spread depression—he might say distress, which they saw around them, and which had aroused them to public action. If he understood the objects of the meeting aright, it was not, however, merely to assert their distress and proclaim their losses, but to state publicly that they believed themselves to be unjustly subjected to a heavy and burthensome duty, and to devise the best possible means to get rid of it—to assert that the hop duty in its apportionment was unjust and unequal as a tax. There was no other tax like it upon any industrious class whatever in the country. He was well aware, however, and he did not wish to ignore it, that there were even hop-growers who would prefer that the duty should remain as it was, rather than that it should be repealed. That desire arose from the circumstance that those growers had many peculiar advantages of soil and situation, and did not feel the pressure to the extent that the majority of growers now experienced. That was the reason why they found those persons were in a position to pay the duty. But he could not consider the mere fact of one particular set of planters in a certain district desiring to maintain the duty was any argument in its favour; indeed, he should rather say no further proof was necessary that the duty was unjust and unequal, because one set of men were anxious for its continuance, while the majority were oppressed by it, and wished for its repeal. The persons who were anxious that things should remain as they were, asserted that hop-growing always had been, and always would be, a lottery; that it was a great speculation, and that all who entered into its cultivation ought to be prepared to meet its contingencies. They had been told that if they were patient the market would rise again, and they would have more years of profit. He well knew that they had had such years, and that they might occur again, even under the present system. But upon what circumstances would that improvement arise? It would be the very consequence of their present ruin, and the evils which had been already inflicted by the duty. Planters had been driven to grub their hops, and cease from their cultivation altogether, and it was at such a cost and sacrifice that any temporary prosperity would be secured. The attendance around him persuaded him that they were no longer inclined to submit to this unjust imposition.

Mr. **Moses Body** then rose to propose the first resolution, which was, "That the excise duty on hops is most oppressive to the grower, unequal in its pressure, most uncertain in the amount of revenue derived from it, and most unjust, hops being the only agricultural produce subject to taxation in the hands of the grower, upon which the duty is levied irrespective both of the value of the article and the cost of production." He did not stand before them as an advocate of free trade in hops, for he did not know that they could grow hops under that principle. Some told them that the duty was a tax upon the consumer, and that it did not press much upon the grower; but they well knew that they had very recently been selling hops at 17s., 18s., and 20s. per cwt., and he should like to know who had paid the duty on those, if the grower had not. It was very clear it was not paid by the consumer (Hear, hear). It was also said that they could grub their hops if they found the cultivation of them did not pay, and thus relieve themselves of the burden. He had no doubt they all knew, being practical men, that there was some difficulty in that matter; they were aware that they had a large amount of labour upon their hands. He, for one, had lately, and perhaps most of the large planters had, grubbed a portion of their hops; but they could not get rid of the labouring population. That hung upon them in some way or other, and they must be maintained; and he had himself set on many extra hands, because many were literally starving. In fact, he had more hands than he knew how to employ; but in the country districts it was not so easy to be disengaged from them, and that was one reason why it was so difficult to get rid of their plantations. If a man took a farm of some 200 or 300 acres, of which 20 were planted with hops, a large proportion of the valuation was taken upon the hop ground, perhaps £20 or £30 an acre. Therefore a man's capital became locked up in that way; and if he grubbed his hops, he by that means destroyed his property. Another reason why they could not grub their hops so easily as was supposed was that it was always after a heavy crop that they wanted to grub, because there was a larger produce than they required; in fact, they could not regulate the supply. With malt it was just the reverse—they made as much as was wanted. But they could not manage the hops in that way, as they did not know what produce there would be; but, after all, so far as grubbing was concerned, the greatest drawback was the duty itself. A man had got perhaps ten or twenty acres, prices were very low, and the tax something like £20 per acre, if he grew a ton an acre: He grubbed his hops and covered the land with corn, and probably got a profit of £3 or £4 an acre, but the succeeding crop had to pay the tax upon the previous year's produce (Hear, hear); therefore, if a man had £300 or £400 duty to pay upon twenty acres of hops, it ruined him. He must not, therefore, grub. Those were strong reasons, he thought, why they should get rid of the duty; but he had no doubt they all knew the matter as well as himself. He had been a grower for the last twenty-five years, and during late years at a considerable expense. He had found it a most unprofitable speculation; and he was persuaded that, unless they got rid of the excise duty, they could not continue to grow hops in these counties. If that were so, he would ask, "What would become of the labouring population in the hop districts?" He was himself at a loss to know.

Mr. **Parker** (Tunbridge) seconded the resolution, which was carried unanimously.

Mr. **John Simes** rose to propose the second resolution, which was as follows: "That it is the duty as well as the interest of all hop growers and others resident in or connected with the hop districts to take all the means in their power to procure the immediate abolition of this unjust tax." He was in the habit of making valuations, and he had been struck at the number of farms that had lately been stripped for payment of the hop duty. He was also in the habit of receiving rents, and had therefore had opportunities of noticing the difficulties with which those payments were met, and in many cases could not be met in consequence of the tenants having had to meet the hop duty. He was well aware that there was a difference of opinion upon the subject, and he was very sorry that it was so. It was only a few, however, who objected to the present movement, and they were only those who were seeking to retain a monopoly: they were trying to drive the industrious classes out of the market. If they made a fair calculation they would find that in the Weald of Kent and Sussex they had been paying something like 35 or 40 per cent. more than the Mid-Kent people. There lay the question. Let the Kent people, who were so bigotted in their opinions, and who tried all they could to drive others out of the market, have 40 per cent. put upon them. How would the question appear then, he should like to know; he was sure that they would soon be rowing in one boat, and all would go hand and heart together in the endeavours to get the tax removed. All they wanted was a fair stand up fight. At present he was quite satisfied they were labouring under free-trade prices, and had at the same time a heavy duty hanging over them, and they need not expect to get anything during the next two years in the shape of new profit. The duty consumed them more than free trade. If any of them had anything to say on the subject he hoped they would do it manfully, and let the public know that they were unanimous. They must give a "long pull, a strong pull, and a pull altogether," until the tax was laid under their feet.

Mr. J. Kenward (Uckfield) rose to second the resolution. It might not, he said, be deemed prudent on his part to do so, as he had been on the opposition side, but he now found that he had been travelling on the wrong road. He made it his business, however, to attend that day, and render his assistance in endeavouring to get rid of the tax.

Mr. J. Wibley (Sevenoaks) said he was a grower of high-priced hops, but he heartily agreed with the two resolutions that had been proposed. He was an old free-trader, and did not fear the importation of foreign hops in the least. He thought the high-priced men in Mid Kent and East Kent would benefit more from free-trade than any part of Sussex or the Weald of Kent; the consumption would increase according as hops were lowered in price. Why should they be ruined in their prosperity year after year, merely to be protected £1 6s. from foreign hops? it was a complete bugbear; it was all very well when hops were eight guineas a cwt.

Mr. Body begged distinctly to state that the society they had formed was not established in any respect as a free-trade society, upon free-trade principles. They had nothing whatever to do with free-trade. He had made those few observations from fear that some wrong impression might go abroad upon the matter.

Mr. Whibley said he did not think anyone would volunteer to go to Government for a repeal of the Customs' duty; they did not ask for the repeal of that duty, but the question was one of a free trade character.

Mr. Thirkell said he was a large grower in the Weald of Kent. He trusted they would wake out of their sleep, and make vigorous exertions to obtain the repeal of so unjust a tax.

The resolution having been unanimously carried,

Mr. Nash (Rochester) said he had been called upon to move—"That a society having been formed to promote the repeal of the duty upon hops, this meeting pledges itself to take the most active measures to support that society in the attainment of its object." He stood before them as a Kent planter of more than twenty years' experience; he had grown hops in the hill district as good as most men grow, at least they had fetched as good a price—and he must say that he did not wish to see any gentleman grub his hops. He had been to Somerset-house and made extracts from some of the books. He would have them clearly to understand that there were altogether three duties—the old duty, the new duty, and the 5 per cent., and he would tell them what had been the amount of each for every year. In 1711 the old duty of 1d. in the lb. was put on; 1778 the 1d. per lb. was continued, and the 5 per cent. was put on; in 1780, 10 per cent. was added; in 1783, 15 per cent. was added; and in 1786, 1½d. and 2-20ths was added; in 1801 it was 2½d.; in 1806, it was reduced to 2d.; in 1840, when all exciseable articles were taxed, 5 per cent. was laid on; nearly all the latter tax had been removed, the only articles on which it remained being paper, malt, and hops: he believed that was a fact. He had taken the three years 1855-6-7, and he would give them the returns for those years, as he had taken them from the House of Commons. The amount of the new duty and war tax in 1855 was £294,643 10s., and the additional 5 per cent. on that was £34,661 10s. 4¼d., making £329,305 0s. 4¼d. The planters had been called upon to pay that above the 1d. per lb. duty. Those were startling items, but correct ones. In 1856, the new duty amounted to £197,869 2s. 4¾d.; and the additional 5 per cent., £23,267 1s. 3¼d.; making £221,136 3s. 8d. In 1857, the new duty was £168,999 13s. 10¾d., and the additional 5 per cent. being £19,879 15s. 6¼d, making £188,879 9s. 5d. The total of the last three years, of what he would say they were called upon to pay in excess of the 1d. per lb. was £739,320 13s. 5¼d. If such a statement as that, of which he vouched for the truth, would not make them active, he did not know what would. Allusion had been made to the customs duty, which he did not think they had any right to have; for what had they to be afraid of, when he told them that the customs duty upon hops sent into this country year before last, and charged at 45s. per cwt., only amounted to £22,546? It did not amount to £10,000 of their duty, and were they willing to pay £417,526 to keep that £10,000. He recommended they should call a meeting in every parish, and get up subscriptions in every possible way. He for one would pledge himself to get subscribers to the amount of £50. Many people he was aware agreed with Mr. Dodson, M.P., that members of parliament did not know very much about the subject of the hop duty; but he begged to assure them that from many interviews he had had with those gentlemen they did know something of the subject and were taking a lively interest in their welfare. He was happy to tell them that he had received many promises from members that they would vote for the repeal (renewed cheers). He hoped therefore the planters of Sussex would set a first-rate example, and they might depend upon it that others would follow them, for they were all beginning to feel the pressure and would be glad to work alike. He had gone the length and breadth of the three kingdoms; and knew the general feelings of the country. If the planters would help themselves, everybody else was ready to assist them.

Mr. Barclay seconded the resolution. He observed that let him go where he might, and the subject of the hop duty was mentioned, people who knew nothing about it frequently said, "What did it signify to the planters? They got their prices for the hops, which included the duty, or they would not grow them." That was a point to which they should turn their particular attention. The growers knew and felt that they paid the duty, and that in many instances they never got back again any sum of money which at all represented it. There were too many of them held hops of 1855, and there was very little doubt that a large proportion of them would never be sold, and the growers would therefore not see the duty, to say nothing of the expense to which they had been put. What they had to do principally was to show, as nearly as they could, the situation in which they were with regard to the duty. They were called upon to pay it whether the hops were sold or not, and under any circumstances; if the hops were spoiled the duty must be paid out of their pockets. But the business in which they were at present engaged was as important a matter as any hop-grower could undertake, for they ought to get rid of the excise duty if they could by any possibility; for he was sure there were very few farmers who did not feel that heavier than any other payment. It was asked for in large sums, and at a time when they had sold the article for which it was claimed. If they did not care for the duty, and he believed there were a few in that situation, he would say, don't subscribe; but if they did, subscriptions would enable them to get rid of it.

The resolution having been carried unanimously,

Mr. Barclay proposed a vote of thanks to the chairman.

The **Chairman** acknowledged the compliment, and the meeting separated.—(Abridged from the *Sussex Express.*)

LANGUAGE OF INSECTS.—I have frequently observed two ants, meeting on their path across a gravel walk, one going from and the other returning to the nest. They will stop, touch each other's antennæ, and appear to hold a conversation; and I could almost fancy that one was communicating to the other the best place for foraging. This Dr. Franklin thought they have the power of doing, from the following circumstances: Upon discovering a number of ants regaling themselves with some treacle in one of his cupboards, he put them to the rout, and then suspended the pot of treacle by a string from the ceiling. He imagined he had put the whole army to flight, but was surprised to see a single ant quit the pot, climb up the string, cross the ceiling, and regain its nest. In less than half an hour several of his companions sallied forth, traversed the ceiling, and reached the depository, which they constantly re-visited until the whole of its contents were consumed.—*Jesse's Gleanings in Natural History.*

COMPOSITION OF FISH MANURE AND SOME SORTS OF ANIMAL REFUSE.

Although the importance of all sorts of animal matter as a manure has long been familiar, and has been frequently insisted on, both by science and practice, the immense quantity of such refuse has hitherto become very partially available. The main difficulty which has stood in the way of their profitable application has been the want of a good process by which they can be converted into a portable form. The enormous quantities of fish refuse annually produced in Newfoundland, and even on some parts of our own coasts, has been frequently pointed out as a source from which agriculture might derive valuable assistance. Considerable interest was excited, some time since, by the proposal of various methods by which the desirable object of rendering fish offal portable might be attained, and very important results were anticipated from them. As yet, these anticipations have not been fulfilled, material difficulties having been encountered in carrying most of the processes into operation on the large scale, some of the plans proposed having proved too expensive in practice, while others are so obviously unpractical that no one has been found willing to invest capital in carrying them out. The error, in most cases, has lain in the employment of expensive machinery, which the conditions under which such a manufacture must be carried out may be said to preclude. It is probable that the quantity of fish offal to be obtained at any one spot will not generally be very large, and will be chiefly collected at one period of the year, so that the machinery would require to be sufficient to work up with rapidity the whole of the offal produced, and would lie idle during the rest of the year. It is in some such way that most of the plans have hitherto failed; but I have recently analyzed a sample made by a patent process, which is said to be simple and inexpensive; and should the manufacture yield, on the large scale, a material of uniform quality, and equal to that I have examined, it will undoubtedly prove a very important addition to the list of ammoniacal manures. The manure was in the form of a yellowish powder, in grains about the size of fine oatmeal, remarkably uniform in appearance, very dry, and almost devoid of smell. Its composition was:—

Water,	8.00
Fatty matters,	7.20
Nitrogenous organic matters,	71.46
Pnosphate of lime,	8.70
Alkaline salts,	3.80
Silica,	0.84
	100.00
Nitrogen,	11.25
Equal to ammonia,	13.68
Phosphoric acid in the alkaline salts equal to 1.41 phosphate of lime	0.65

There can be no doubt that, if fish manure, of equally good quality, can be produced, a large demand for it will soon be created. It is, in fact, a very valuable manure, and its price may be estimated very readily, according to the mode employed for Peruvian guano, by taking the commercial value of each of its important manurial constituents as derived from other sources. The values usually adopted by chemists have been at the rate of ⅝d. per lb. for phosphate, and 6d. per lb. for ammonia; or, expressed in tons, £6 for the former, and £56 per ton for the latter. Upon this plan, and taking all the phosphates under one category, we estimate the value of 100 tons of the fish manure as follows:—

13.68 of ammonia at £56	£766
10.11 of phosphate of lime at £6	60
Value of 100 tons	£826

or almost exactly £8 5s. per ton; and this will probably be its average value. At the present time, however, owing to the high price of bones and ammonia, its value would considerably exceed this. Sulphate of ammonia is now selling at £16 per ton, and at this price *ammonia* is worth £64, and phosphate of lime can scarcely be reckoned under £10 per ton, bones at present selling as high as £6, or even £6 10s. If these data be taken for calculation, the value of the fish manure comes to be—

13.68 of ammonia at £64	£875
10.11 of phosphate of lime at £10	100
Value of 100 tons	£975

or £9 15s. per ton. In connexion with this subject, it may be well to observe, that there are many sources of animal matter which must, at the present moment, be entirely wasted, although they might, with a little management, be turned to good account. Of these, perhaps, the most prominent is the blood, and other offal of slaughter-houses, in our small towns and villages. In the larger towns, the blood is collected, although not very carefully, and finds its way to certain classes of manufactories in which it is employed; but in country places it is, for the most part, allowed to escape. It would be a matter of some interest to ascertain the annual value of the blood and offal thus lost, which is undoubtedly very large, and a great part of which might easily be saved by a very small expenditure of care. Such, however, is the carelessness of the workmen employed in slaughter-houses, that I have been informed, that, even in the large towns, it is with difficulty that they can be persuaded to save the blood, although its price is really considerable. Fresh blood contains nitrogen, equal to about 3 per cent. of ammonia, and is worth about 2d. per gallon, or nearly £2 per ton; and any farmer, living near a small town, might advantageously contract to take the whole of the blood at this price. There are many other sources of animal matters which will at once occur, available for manures. Of these, we may particularise the refuse of glue and oil-boiling works, which yield, annually, a considerable quantity of nitrogeous offal; and the two analyses of seal and glue refuse which follow will show that, even when they are prepared without much care, they may become useful manures:—

	Seal Refuse.	Glue Refuse.
Ash	36.81	53.18
Organic matter	41.85	38.60
Water	21.34	8.22
	100.00	100.00
Ammonia	2.24	2.00

The large quantity of ash in these cases is due to the admixture of earthy matters, for the purpose of drying up and rendering portable the animal matter; and, though this has not been done in the most suitable manner, the value of the manure is about five times as great as that of good farmyard manure.—PROFESSOR ANDERSON, in the Transactions of the Highland Society..

GRINDING FEED.

Experimental farmers have long urged the importance, and even necessity, of chopping or grinding hay, as well as other food, for cattle and horses. The lazy drones have had a hearty laugh over the idea, and called it "Book Farming."

Now the theory of chopping and grinding food is based on a principle which lies at the foundation of animal physiology. Rest is essential to the accumulation of muscle, as well as fat. If we wish to increase an animal in flesh or fat, we do not work him.

Now a cow wants one-thirtieth of her own weight in hay a day, to keep her in good order; and we may thus calculate the amount of labour required to masticate the food, and fit it for the stomach. The labour of chopping or grinding twenty-five pounds of dry hay a day, is no small item. This excessive labour is performed by one set of muscles—the jaws; but, by sympathy, affects all the other muscles; causes the blood to circulate quicker, the breath faster, the consumption of food greater; and still the growth of the animal is retarded.

If a machine was invented to *grind* hay, the ground article would approximate, in value, to *unground* oats, in producing fat and muscle. Chopping hay and stalks is valuable just in proportion as it approximates to grinding, and relieves the animal of the labour of grinding it. An animal fed on ground or minced food may perform an amount of labour equal to grinding it fit for digestion, and fat as fast as another which does not labour, but grinds its own food.

Prematurely grey whiskers and beard, while the hair is still black, show the relative amount of labour performed by the jaws and the head.

LIME, AND ITS CHEMICAL CHANGES.

Lime is not, as it was once supposed, an *element*, but consists of the metal calcium united with the gas oxygen, and is properly an oxide of calcium, just as potash, soda, and magnesia are oxides of potassium, sodium, magnesium. It is never found pure in nature, except occasionally in the craters of volcanoes, but is usually united with carbonic acid, for which it has a strong attraction. In this state it is neutral, and insoluble in pure water. When limestone or any other form of carbonate of lime is exposed to a sufficiently high temperature with access of air or moisture, the carbonic acid gas is driven off, and the lime which remains is called *quick* or *caustic*, from its strong alkaline re-action. When such lime is plunged into water for a short time, or water is poured upon it, heat is evolved, the lime swells, cracks, gives off much watery vapour, and finally falls to a powder. This powder or slaked lime is a *hydrate* of lime, water being chemically combined with it. In this state it is still caustic, though somewhat milder than when fresh from the kiln.

The rise of temperature is so great when large heaps of good lime are suddenly slaked, as to enflame gunpowder and scorch wood; it certainly exceeds, according to Pelletier, 500°; and when the operation is performed in a dark place, light is also evolved. All sorts of imaginary causes have been assigned to account for these phenomena. They are referable, however, to a very simple and universal law. All substances during their change from a gaseous to a liquid, or from a liquid to a solid state, evolve heat, and *vice versa*. The intense cold produced by liquefying ice or snow by admixture with salt is a familiar instance of the latter; and the heat evolved in solidifying carbonic acid under intense cold and pressure is sometimes dangerous evidence of the former—the expansion of air consequent on the sudden liberation of heat from the carbonic acid in the moment of congelation not unfrequently shattering the vessel to atoms.

Lime in slaking will absorb one-fourth its weight of water; but the slaked lime is not more moist than before. The water unquestionably, therefore, is chemically combined with the lime, and becomes *solidified*; and it is simply owing to this solidification of the water that heat is evolved.

Caustic lime has a strong affinity for water and carbonic acid. When kept in a dry place it gradually slakes, cracking, splitting, and crumbling to powder with the evolution of heat —which, however, is not so perceptible on account of the length of time during which the process is extended—just as though it had been slaked by pouring on water. In this case the lime has obtained from the atmosphere the 25 per cent. of water it needs to slake it. There is this difference, however, between *air-slaked* lime and that which is water-slaked: the former is slaked precisely as the latter, by the absorption of water, but it also absorbs carbonic acid from the air, and instead of being simply a *hydrate* of lime as when water-slaked, it is a definite compound of hydrate and carbonate of lime, 42.6 per cent. of the former, and 57.4 of the latter. *Air-slaked* lime, therefore, is far from being so caustic as water-slaked, upwards of one-half of it being reconverted into the same chemical state as it was in before burning.

After the lime has absorbed sufficient water and is completely fallen to pieces, carbonic acid is absorbed much less rapidly, especially in damp situations. In fact, though there is a constant tendency in lime to return to the state of carbonate in which it existed previous to burning, yet, by mere exposure to the air, it does not attain this state in any assignable time.

In some walls 600 years old the lime has been found to have absorbed only one-fourth of the carbonic acid necessary to convert the whole into carbonate; in others, built by the Romans 1800 years ago, the proportion absorbed has not exceeded *three-fourths* of the quantity contained in natural limestone.

When slaked in the ordinary way, by the application of water, lime falls to pieces without the absorption of but little if any carbonic acid; but when slaked and exposed to the air, the absorption of carbonic acid is at first very rapid, but it gradually becomes very slow, and probably the same definite compound of hydrate and carbonate of lime is formed as in the case of air-slaked lime.

The original limestone, or any other form of carbonate of lime, then, is perfectly mild. By driving off the carbonic acid by heat we get lime which is very caustic: by slaking this with water we get a less caustic substance—hydrate of lime: by allowing it to air-slake we get a still less caustic compound —a definite compound of hydrate and carbonate of lime: and by exposing it to the air for a sufficient length of time we ultimately get the whole reconverted again into its original mild form—carbonate of lime.

THE OLD AND NEW SCHOOL.

The true criterion of farm-management will be found in the result; and when we see different systems producing nearly similar results, it is worth inquiry how they have been brought about. We generally have two classes of farmers in every district—the first, as he is called by his modern neighbours, "one of the old school"; the second, as he is termed by the other, "one of the new school"—both titles expressive of their modes of proceeding.

As regards the first of these, we have one who acts methodically: he adopts a system, and pursues it, without in any way diverging from it. His expenses are reduced to a certain standard, and from year to year are almost without variation in amount. His returns differ only as seasons or prices dictate, the proportions in acreable quantity being always the same; and whether he adopts the four, five, or six-course shifts of husbandry, his pursuing it for years together, without the slightest alteration, enables him annually to estimate the result, so far as external operating causes will permit him to do so; while the varying success or failure, in a single year, will necessarily depend upon circumstances which he cannot control. Upon a farm of 400 acres of arable we shall find regularly 100 acres in wheat, 100 in barley and oats, 100 peas, beans, or clover, and 100 acres green or fallow crops—such as rye, vetches, turnips, mangolds, or rape. By pursuing this uniform system the quantum of labour requisite for the cultivation of the farm is invariably the same; and, that being the case, all other proportions of expenditure necessarily follow; so that year by year the variation will scarcely be appreciated, excepting, as already stated, when it has arisen from circumstances altogether beyond his power. The prices may vary, but the measure will remain the same: thus rent, labour, and seed-corn continue in the same proportion; parochial charges, tradesmen's bills, and tithe rent-charge fluctuating only to a limited extent, but never materially affecting the general result; and housekeeping and personal expenses rarely vary more than from five to ten per cent. Thus each year has its fixed expenditure; the farm thus striking, as it were, its own annual balance of profit or loss as it proceeds.

On the other hand, we find the experimental farmer adopting every theory as it arises: he pursues no stated system. In some years his various descriptions of grain crops far exceed those of others; he has learnt to autumn-fallow, and his principal exertion, if it may be termed such, is to farm as little without it as he may be able. He produces roots rather as successional than principal crops, adopts autumnal fallowing as his system, purchases manures *ad libitum*, produces grain crops in successive seasons on the same land, abolishes every previous rule of rotation, and consequently in some seasons his acreable quantities of grain will far exceed those of others. His expenditure also in labour varies greatly, but is generally materially increasing in amount, both as regards horse and manual. His outlay in implements, cattle, oil cake, and cattle food is so large, he becomes subject, to a great extent, to the fluctuations that attend trade. His returns are doubtless increased; but his outlay is in like ratio; and what perhaps is worst of all, the current year does not exhibit its profit and loss sufficiently clear to demonstrate to himself what is the actual profit or loss, or how things are really progressing.

It is not our intention to deprecate improvements or high-farming; but our object is to exhibit to farmers that a methodical system, when carried out, is most advisable, and generally most conducive to success; for just so far as a farmer strikes out a new path, he becomes also subject to greater risks, and which, without corresponding talent and adequate capital, is not likely to lead to any beneficial results. Whatever is done well continuously carries its own reward; but an indiscriminate application of capital, without a corresponding increase of skill and perseverance, will be almost certain to lead to disasters; and we therefore caution experimental and ardent cultivators to pause as they proceed;! for although we are quite aware that a large return of any particular description of produce can be sometimes obtained, still there are certain limitations, to which, upon an average, it must be reduced; and even then much will depend upon the skill used in arriving at such an end. We have lately read of a very large expenditure about to be made upon an estate, very far exceeding the value of the fee. We have before heard of this in other quarters; and whether it be as example or experimental farms that they come before our notice, it is not sufficient to inform us that the production has been doubled, if the investment and expenses have been doubled also. The clear profits, after all, must become the test by which the speculation has been carried on. It is an old adage, but a true one, that we see the ships only that arrive in port; those which have gone down are forgotten. The successful agriculturists have mostly been found amongst the class first named; and when we consider the operating causes producing such results, we feel we shall be only anticipating the conclusions of our readers that this must ever be so.

THE CLASS OF PLANTS MOST LIKELY TO ENRICH THE SOIL.

Sir,—There is too general an idea abroad among farmers, especially our moderns, that he who buys the most manure, artificial or otherwise, is, and must be, the best farmer. I happen to think differently, and consider that he who gets the greatest return for the capital expended displays the most wisdom. The sorts and varieties of plants grown have, I think, much to do with profit, with the same management. It is a well-received opinion that plants absorb a considerable amount of material from the air, as carbon, &c. Now, if the leaf of the plant, as philosophers tell us, be the medium of conveyance of matter existing in the air, what is the natural inference but that we ought to grow those plants which present the greatest surface to its influence? Take, for instance, the turnip plant—how is it that with the same appliances we get one quarter of barley more per acre (with a certainty) after a crop of globe turnips than where swedes have been grown? The thing is clear to our mind; and as matter cannot spring out of nothing, so no more can a good or more superior crop come without a cause. I have grown most varieties of the turnip for many years, and have always found that sort to give the best return which had the greatest top or most leaf. Some years ago there was, and with some even now is, great anxiety displayed to get that kind of turnip which had the largest bulb and the very small top. The after-corn returns disappointed that choice as a natural consequence, because the nitrogenous medium had been curtailed. We should aim at a bulb as large as possible, and a top as nearly resembling the cabbage as may be.

It does not follow, as some may suppose, that an increase of top tends to injure the quality of the bulb; far otherwise. The large leaf supplies the bulb with the flesh-forming material it could not otherwise obtain; and in winter affords to that bulb a natural protection pleasing to behold. What farmer at all observant, on a cold frosty morning, has not seen the providential adaptation of the leaf to the bulb when that leaf has succumbed to the cold? I am not recommending the globe variety, or the swede, but that in either case the leaf should be as large as possible.

As regards the manurial properties of the leaf, I consider them always worth as much, in the early winter, to plough in as to eat. The same reasoning holds good with other plants. A field of rape, because of its immense leaf, stands first as an improver. Last year the writer had a field sown with it, and at the same time seeded down with mixed grasses, and it kept and fatted ten sheep to the acre during the summer. The practical farmer will know what the high after-condition of that will be; and this spring it will afford, from the stems left, fine early food for sheep.

On all inferior worn-out lands nothing can equal the fertilising power of the rape plant. Let the land intended be well autumn-cleaned, ploughed early in the winter, manured and limed in early spring (not ploughed after keeping both on the surface), and sown with rape, about 7lbs. to the acre; and at the same time seeded with mixed grass seeds for two years after grazing; and no soil, I think, will refuse the benefit. As regards the cereal crops, the same rule holds good; the more flaggy it is, as it is called, the less exhausting the crop.

The variety called Scotch oat stands pre-eminent in this respect: in itself quite a favourite with the miller, from the oily nature of the grain, and consequently high mealing qualities; and the straw so good, that it stands next to hay as fodder, full of flag, and easily consumed by cattle; while the American, Poland, Zealand, short white oats, and similar varieties with clean flinty straw, draw strongly on the soil, and the straw is but of little value.

Barley is appreciated because of the little injury it does to the soil, and is more flaggy than wheat. Wheat, when the crop has fine clear straw, is, to every observant farmer, more exhausting than the mildewed field. Beans, peas, and other leguminous plants, are considered fertilizers from the same cause—that the quantity of leaf-surface presented absorbs carbonaceous and nitrogenous matter from the air; and consequently they gain more than they lose. And if the principle be true, that in the process of combustion the same elements return to the air which had been absorbed from it by the plants or otherwise, the effort of the farmer (when confirmed by practice) should be to produce and cultivate those plants the agency of which would profit without the direct aid of manures, in many cases too costly.

The subject is one of importance to the farmer, and these few hints may lead abler hands to investigate it, and see whether science and practice in this respect agree; then, perhaps, we may not object to a drum-headed-cabbage turniptop, and kettle-bottom-sized. S. G.

Normanton, Alfreton, March 16, 1858.

FIARS' PRICES.

We give below a table of the fiars' prices of grain as struck up to Saturday, for purposes of comparison between counties. From the various methods taken in striking the fiars, it cannot be expected that a near approach to equality can be reached. Some counties take the purchasers and others take the sellers of grain, and one or two add to or deduct from the prices after the averages are ascertained. In looking over the various prices, the fiars of oats, beans, and meal appear to run nearly on a par and with no great difference in value, but the wheat and barley prices vary in a surprising degree. The general average of wheat appears to be £2 1s. 2d. per qr.; and while Dumfries is 7s. 4d. above this, Edinburgh is 4s. 3d. under it—in fact Edinburgh is within 3d. of being the lowest wheat fiars' price; and, in like manner, take the price struck for barley in Wigtown, 33s. 10d., and the Edinburgh averages of the three prices struck, 24s. 11d.—making Edinburgh for barley 8s. 11d. below Wigtown. The first class barley average in Edinburgh is stated at 27s. 3d.; the second, 25s.; the third, 22s. 6d.; while during same period the average of all kinds sold in Edinburgh stock market would reach 28s., or thereby, while first-class barley would certainly be above 29s. 6d. to 30s. of average:—

FIARS' PRICES—CROP 1857.

Shire.	Wheat.			Barley.			Oats.			Beans.			Meal.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Dumfries .	2	8	6	1	9	6	1	0	10	1	19	5	0	17	3
Renfrew ..	2	5	0	1	9	8	1	1	8	2	0	10	0	17	10
Inverness .	2	3	6	1	6	3	1	1	10	2	0	0	0	18	10
Nairn	2	4	6	1	6	0	1	2	0	2	0	0	0	17	9
Wigtown .	2	1	6	1	13	10	1	0	8	1	18	0	0	16	11
Ayr......	2	3	2	1	10	8	0	18	9	2	1	0	0	16	3
Dumbartn.	2	2	1	1	7	5	1	1	6	1	19	0	0	17	9
Elgin	2	5	5	1	11	1	1	2	7	1	9	3	0	18	4
Lanark ..	2	3	0	1	6	9	0	19	7	1	19	5	0	16	3
Roxburgh .	1	17	10	1	8	7	1	3	0	1	18	8	0	16	8
Linlithgow.	1	18	9	1	9	5	1	2	0	1	17	3	0	17	1
Berwick ..	1	18	3	1	7	2	1	2	0	1	16	0	1	0	1
Clackmannan....	2	2	2	1	7	3	1	0	5	1	16	9	0	16	6
Selkirk ..	1	18	0	1	7	3	1	1	0	2	0	0	0	15	10
Stirling ..	1	19	7	1	6	9	0	19	10	1	17	4	0	16	9
Edinburgh.	1	16	11	1	4	11	1	1	6	1	17	3	0	16	5
Fife......	1	16	4	1	6	10	1	1	0	1	13	4	0	17	3
Perth	1	16	9	1	5	4	0	19	3	1	14	10	0	16	1
Total ..	37	1	3	25	4	8	18	19	5	33	18	4	15	9	10
Averages .	2	1	2	1	8	0	1	1	0	1	17	8	0	17	2

—*Scotsman.*

THE SPANISH OR MERINO BREED OF SHEEP.

[COMMUNICATED BY LORD WILLIAM LENNOX.]

Prejudice founded on system, devoid of experience, is the greatest and most insuperable bar to improvement in every art and science. It was through false impressions thus imbibed, that although the fine-woolled sheep of Spain had been long ago found to retain their valuable qualities in countries still more unfavourable to them than Great Britain; such as Sweden, Denmark, Saxony, Prussia, and Holland: yet it was not until seventy years ago that George III., guided by his own good sense and the most patriotic motives, gave orders for the importation of Merino sheep, for the improvement of British wool. In 1791 his Majesty received a small stock of four rams and thirty-six ewes from the Negrette flock, and about ten years after another importation of two thousand from the Paular flock, deemed the best in Spain, of which only fourteen hundred ewes and a hundred rams survived the voyage and the seasoning in this country. Prejudice for awhile opposed the improvement of fine-woolled sheep as an innovation. The breeders fancied that the quality of the fleece depended on the climate, soil, and pasturage of their native country, and that the Spanish sheep would not thrive in our island, or would decline, and only yield wool of an inferior quality; in fact, they maintained the erroneous opinion that the British sheep sent to Spain would, by the same advantages, become equal to those of the latter country; and that the Merinos imported to England would soon become similar to our own breeds, even without any crossing or intermixture. It required all the influence of the King, the late Duke of Bedford, Lord Somerville, Dr. Parry, Mr. Tollet, and various others of the most enlightened gentlemen and most scientific breeders, to combat this dangerous opposition; and it was only by proof the most irrefragable that it began to decline; and it is now admitted that Spanish sheep, with nothing more than the common care administered to our own flocks, will not only maintain their natural superiority, but will confer the same qualities to other breeds, if due precaution is taken to preserve the strain in its purity. The chief and only obstacle that remained, was the article of expense to the small farmer or grazier. The woolstaplers and the butchers also raised some objection to the newly-naturalized animals; but it having been ascertained that the wool of the Anglo-Merino is equal, if not superior, to that imported from Spain, and that the flesh, as an article of food, is also of a superior quality, their clamours have also subsided, and reason has taken the place of unfounded declamation.

The advantage of the Anglo-Merino strain being thus acknowledged, the only thing that remained was to consider the best method of bringing the improvement into general practice. It had been ascertained that not less than four removes from a pure Merino would ensure all that was required; and the breeder therefore, having purchased the best Merino ram, persevered in breeding in-and-in to the fourth remove, when he found himself the possessor of a pure breed, without any danger of retrograding, proper care being taken to prevent commixture with any less pure strain. The result was most satisfactory, for from actual experiments made by Dr. Parry the Merino-Ryeland carried more than three times the value of wool on the same living weight of carcase than its Ryeland ancestor did; almost four times as much as the Southdown and Lincoln, and nearly five times and a-half as much as the New Leicester. It appeared moreover, from Lord Somerville's trials on the Ryeland and Merino-Ryeland breeds, that the value of the wool on the latter is as five to two of the former—an increase which more than compensated for any additional expense or trouble. To those who are interested upon the subject of Spanish sheep, we recommend a perusal of a very clever treatise by Monsieur Lasteyrie, an intelligent Frenchman, which has been translated into English. He defended the system, which brought George III. under the lash of ridicule of Peter Pindar, viz., that of feeding sheep on horse chestnuts. Monsieur Lasteyrie thus writes: "In Saxony great care is taken to collect the horse chestnuts, which are regarded as a wholesome aliment, and a specific against the rot. These are given to the sheep in autumn, when the green food ceases. The chestnuts are cut into pieces, which it would be dangerous to omit, as they might otherwise stick in the throat of the animal, and cause its death. Sheep, as well as cattle, refuse at first to eat this food; but, when accustomed to it, they seek it with avidity, and even like to eat the prickly husk in which the nut is enveloped."

One of the first toasts at sheep-shearing feasts used to be—

> "The glorious memory of George the Third,
> Who first to Britain Spanish sheep transferred."

In the Consort of our Gracious Sovereign we have one who possesses the good sense, sound judgment, and patriotic spirit of her royal grandfather, and who, as a practical farmer, will exert his influence to improve the breed of cattle, pigs, and sheep, by never rejecting without a trial any rational hint of improvement.

ORDER UPON THE FARM.

It has been very correctly said that order or method is the secret of success of many wealthy men of the mercantile class. The above being true, the rule is equally applicable to the farming classes. What we mean by order is, "a place for everything, and everything in its place." By everything, we mean all that a farmer uses in his business. A farmer should see that every rail and board about his premises is in its proper place; that his fences are in condition to prevent the entrance or exit of his own or other people's cattle without his consent. Every one who neglects this neglects his peace of mind, as well as subjects himself to losses that must be repaired by means that could have been otherwise profitably employed.

I have known cultivators of the soil to succeed well in maturing crops, but by neglecting to keep their fences in order, lose the most valuable part of their labours. But I am glad to state that such cases are not frequent in these times. In the next place, the farmer should not allow his cattle that are used in the farm-work to be scattered indiscriminately over his fields, as much time is lost in getting them to their places, and as "time is money," it should be economised as much as possible. He should be careful to have his harness all in using trim, his working cattle near his harness house: then but a few minutes are required to prepare for his day's ploughing and hauling. His implements, of every description, should be kept near his dwelling, that no time be lost in repairing those things that are out of order. Many persons will say that they cannot find time to do all these things. Stop, dear reader; I know you can, because whenever you see a rail missing from your fence, go and put it back immediately, for then is the right time. In case the rail should be destroyed, appropriate the first idle one you come to; if you should have no idle ones, lose no time in procuring some; for if you do not, nine chances in ten you lose more by neglect than if you stop the plough long enough to make them. Whenever you have done using a plough, hoe, rake, hay fork, thresher, reaper, or anything else, take it immediately to the barn—make this an invariable rule, and let all your men know it: the result will be, that when anything is wanted, the person sent for it will know where to find it. I would have every farmer have some of the most necessary tools used in making and repairing his implements of husbandry, for I know every one who is able to own a farm is able to have such things. The rainy season, in which much could be done in the way of making and repairing, is always lost to most farmers, because they have not the implements of manufacture. During such times he might put all his farming utensils in excellent working order; whereas if it is neglected until fair weather, he has scarcely had it done before another rainy season overtakes him: thus, all fair weather, in which he might have ploughed, passes in repairing. To conclude—Farmers, preserve order in everything, and peace, prosperity, and health will accompany you through life.—*Watchman and Reflector.*

THE DIFFERENT BREEDS OF STOCK.

In the infinity of agricultural topics we are now continually discussing, it is curious to notice how rarely we touch on our different breeds of stock. We of course learn the individual excellence of animals from their positions in the show-yard, and occasionally test the merits of a herd by the prices it will bring at the hammer. There is many a man, too, ready and anxious enough to cry up the sort he himself is interested in; but what we want is, that these opinions should be brought into rather more direct comparison. At this very moment there are two or three beasts that make "the best butcher's meat"—the Scot, the Welsh runt, and the Devon. Then the Short-horn is good to feed, but bad to milk; or, on the other hand, he is as useful for one purpose as the other. The very essence of discussion is difference of opinion, and here we should be sure of it. Still we scarcely remember a single occasion on which the object of a meeting has been to consider which are the best kinds of stock. The Highland Society certainly gave an evening some two years ago to the assumed advantages of crossing; and the London Club has two subjects on its card this season on the management of stock. We repeat, however, that the great question itself is seldom or ever put:—Which is the best beast—a Hereford, a Short-horn, or a Devon? Which is the best sheep—a Southdown, a Leicester, or a Cotswold? And which the best horse—a Suffolk, a Clydesdale, or a Lincoln? We do not say it would be possible to pass any very definite resolution in answer to such queries; but nevertheless a great deal of interesting information might be obtained by such a means. At present we would almost seem to agree with Mr. Mechi in regarding our flocks and our beeves merely as necessary nuisances, and so saying little or nothing about them.

A comparatively young association in the North of Scotland has within these few weeks taken the bull by the horns. Mr. Home, the Chairman of the Stirling Farmers' Club, has opened a discussion "On the various Breeds of Cattle." In doing so, he naturally dwelt chiefly on such kinds as he himself and his brother-members were best acquainted with:—"I speak of our well-known black cattle, which, although reared in many parts of our country, are yet shown to greatest advantage and perfection in the county I have named, Argyle. It cannot fail to be observed that good specimens of our black cattle possess almost every point that the breeders of cattle of England and elsewhere are endeavouring to produce. We all know their fineness of hide, straightness of legs, length and breadth of hind-quarters, fine development of breast and chest; and we know that that breed which is most highly esteemed, so far as we can compare a large beast with a small one, is almost exactly the same. The quality of their flesh is considered wholly unsurpassed, there being a fine degree of marble mixture of fatty matter which cannot be surpassed. It is well known that the nobility and gentry of England get up our Scotch kyloes as their finest beef. They are in a half-wild state, and must be fed fat upon grass, for the Highland ox takes as long to get accustomed with a byre as another to be fed fully fat in it. As milkers they do not excel in quantity; but the quality is shown by the manner in which they suckle their calves."

This is more than commonly well put, and certainly so far our Northern friends have no fault to find with their champion. He proceeds to what he terms "a peculiar breed"; but a better known one amongst us, that reared in Galloway, Aberdeen, Kincardine, and Angus. "How that breed has come to be what it is, forms a difficult question—whether they be a species of the West Highlander somewhat changed, and having lost their horns, I don't know; but there is a peculiarity regarding them. Those in Galloway are larger and thinner from the hook to the tail, though not so broad as others; while those in Aberdeen are broader over the back. It may be mentioned that the latter county has at this time the honour and glory of supplying what in the London market is called pure Scots, and they carry the highest price for beef in the London market. In regard to their milking properties, I have the authority of Mr. M'Combie, of Tillyfour, that they are excellent milkers; and he scouted the idea of an Ayrshire being compared with them in Aberdeenshire. I may mention that his place is by no means a garden of Eden, being without shelter, on the top of a hill; and yet there are to be seen some of the most magnificent animals you can conceive. Long may the Aberdeen folks have the credit of producing the best Scots for the London market."

So that even in Scotland there are two or three varieties which make "the best London beef." We have, then, the Fife breed, "few in number," and according to another speaker, "coarse in quality, and not to be recommended." The discussion from this point assumed a more general tone, as it touched upon the merits of two sorts of which we have all more or less some experience. These were the Ayrshires and the Shorthorns—animals that would appear to be not only bred, but reared, and cultivated for diametrically opposite uses. The over-feeding of the Shorthorn, so that he shall do nothing but make flesh, is an old story. Mr. Home dwelt upon it at some length:—"I am far from thinking that if you keep them according to the present English rules you will be greatly benefited by them. Some of the means at present adopted go to deprive the animal of its milking powers, and render it unnatural in its inclination to take on fat; but if they are made to keep in a good, fair, growing, breeding state—in fact, in that state of exuberant health which makes them suitable for breeding—the country would greatly benefit by their introduction. Unfortunately, the great run has been upon shape only, to the neglect of milking and breeding qualities. I may mention, in confirmation of my remarks about the fattening of the Shorthorn, that I was at the Newcastle show of the English Society some years ago, and was going round the yard with Mr. Booth of Killerby. He was reckoned the first breeder of fat stock in Yorkshire, and was only equalled by Mr. Bates, whom he never liked to meet, so close was the competition. Mr. Booth's cattle were very high fed; and one cow he had at that show (Necklace, I think, was her name) was as magnificent an animal as one could wish to behold. But then she had, as it were, pillows of fat sewed on to her hind quarters and along her back. I remarked that the calves of such an animal must be very valuable. He answered, 'I am sorry to say I have been rather unfortunate in that respect—the calf died.' After expressing my regret, I said, 'Do you not think she is rather fat?' He said that perhaps she was a little."

The Ayrshires are to be condemned for the very reverse of all this. "It is a breed generally allowed to be superior to all others for quantity of milk. The

Ayrshire breeders have, for many years, been driving at that point—namely, good milking qualities, and I regret to say that I fear they have done so to the neglect of the feeding qualities. A recent writer, speaking of Ayrshires, says, that one cause of the pleuro-pneumonia is that they are bred too fine, and I am of opinion that there is some truth in this. The same writer also said, that if a breeder has a first-rate bull, he was put to his nearest relations, to his own mother, daughters, or cousins, thus breeding too much in-and-in. Whatever causes operate to produce the effect, I do not pretend to say; but it is an acknowledged fact the Ayrshire breed are deficient in beef and growing qualities. They are, generally speaking, narrow in the chest, and cannot have a large development of lungs, so that they may be predisposed to take injury or catch cold."

The difference between the two is yet further demonstrated. If the Shorthorn is fed *up* the Ayrshire is as systematically fed *down*. Mr. Gray, of Bearside, was once leaving the house of a friend where he had been to buy a bull, when he saw an Ayrshire calf which could scarcely move about. He asked what was the matter? "Nothing," said his friend, "only we must starve the calves the first year to make them fine, or they would grow up large coarse animals."

The point of the debate was, nevertheless, all in favour of the Shorthorn. As a cross for almost any kind of Scotch cattle there is clearly nothing equal to them. "Mr. Bates, of Kirklevington, once told me (Mr. Home) he had got a lot of West Highland heifers, and put Shorthorn bulls to them; thus producing the most admirable animals he ever saw—pictures of many of which he had hung on his walls." Mr. Stobie, of Ballochneck, not only confirmed this, but went on to mention that he exhibited two cross-bred heifers at the recent show of fat cattle at Glasgow—one of which gained the first prize, and was out of a small Ayrshire cow, by a pure Shorthorn bull; it was a very fine animal, and admired by every one. "He had no hesitation in saying the Shorthorns, and first crosses were the easiest fattened breed, and in times like these, when the farmer must get his goods quickly to market, they were the best." Mr. M'Nellan had found the Shorthorn the easiest fed, and a cross between the Shorthorn and Ayrshire exceedingly useful—in fact, as easily fed as the Shorthorns; and, while he had reared this class to 50 stone, he could not rear an Ayrshire to more than 35. And Mr. Chrystal was of opinion that a Shorthorn bull with Angus cows would make an excellent animal; but, if such were done, he would stick to the first cross, and never cross again.

The Chairman, in his reply, even took up the cudgels for the Shorthorns on their weak point: "The milking qualities of the Shorthorns were fully equal to the Ayrshire. All the dairies in London were filled with Shorthorns, and the Londoners were pretty well up to the way of getting most value for their money. He had known one Shorthorn cow that gave 18 Scotch pints (36 quarts imperial) of milk per day, and the amount of butter he did not recollect, but it was something immense; while at Keir he believed there was a Shorthorn cow which was a most magnificent milker. All this went to show that the Shorthorn breed contains all the good milking properties, but they had been destroyed by endeavouring too much to get a monstrous fat beast." There is a great deal of truth and sound sense in all this. Indeed, we must especially compliment Mr. Home upon the manifest justice with which all his remarks were made, as well as upon the great attention he has clearly given to his subject. Cattle are not merely fed too highly for breeding purposes, but even it is said for that of consumption. A London surgeon has recently been alarming the town by a declaration—founded upon *post mortem* examination—that there was scarcely a beast exhibited at the Smithfield Club Show but was so grossly over-fattened as to be unfit for human food! Without going quite so far, the abuse at our summer stock shows is altogether indisputable. Scotland itself affords a very recent and striking example of this. The famous "John O'Groat," the first-prize bull this year at both the English and Scotch national meetings, and one of the grandest Shorthorns ever seen, has since died. Mr. Home, "for one, however, was not altogether unprepared to hear of such an event. If an animal is fed up to a state quite unlike healthy nature, as the rage is at present, what else can be expected?" This may not be very palatable to some of our friends, but a *home truth* may do them more good than they may at first be willing to admit.

We have followed out this discussion with much interest and satisfaction, and hope ere long to have to chronicle some such similar inquiry on this side of the Border. The new number of the Royal Agricultural Society's Journal has a very able paper on the Implement Show at Salisbury, but not one word as to the live stock. And yet our "different breeds of cattle" is no so unimportant a thesis, after all.

THE CONDUCT OF THE PARIS MEAT TRADE.

We recently referred to the price of cattle in France and England, showing that the British grazier had no reason to fear a competition with our French neighbours. We now publish, on page 292, of this number, a paper on the production and consumption of meat in France, and the effect of the present law upon the price of meat, in Paris particularly, and generally throughout France. We are sure that this paper will not only be perused with interest by the English grazier, but it will excite some surprise at the clumsy apparatus set to work for the regulation of the sale of meat by the French Government, to the destruction of all competition, and the encouragement of every species of fraud and peculation on the one hand, and unmerciful exaction of dues necessary to support the system on the other. Between the public taxes and the private plunder—the latter connived at by the functionaries specially employed to protect the public interests—both the producer and the consumer are robbed right and left; whilst the only persons benefited by the system are the butchers, who make enormous profits. In the mean while, the production and grazing of cattle decrease in France, and the quality of what is produced is deteriorated by the operation of the law, and the ruinous deductions between the grazier and the consumer; and the consumption is checked by reason of the high price of meat, the consequence of the prohibitory exactions, amounting to about 3½d. per kilo. on ox and cow beef, 4½d. on veal, and 6½d. on mutton; or on an average from 1½d. to 3½d. per lb.

The enhancement of price, however, is not the only evil of the system. By the law, the butchers are bound to make four kinds or classes of meat, and also to sell cow beef, *as such*, at a lower rate than ox beef. But they have found a means of evading the law in both respects so effectually, that although it is notorious that a vast proportion of cows—generally old and past working and milking—are slaughtered in Paris, *no cow beef* is ever to be seen upon the stalls; and on the other hand, no beef of the fourth or most inferior class, and very little of the third class, is exhibited for sale. The just inference therefore is, that both the cow beef and that of the inferior classes of meat are transferred and merge into the first and second classes, to the extra profit of the butcher, and injury of the public.

To these evils of the present system must be added the enormous quantity of *dead* meat (la viande à la main), generally diseased, slaughtered clandestinely beyond the barrier, and brought into Paris. This in 1846 amounted to 4,560,000 kilos.; but in 1856 it rose to 17,151,000 kilos., or nearly 50,000 head of cattle. We admit that our London market is liable to the same species of imposition, and that large quantities of diseased meat are clandestinely brought thither for sale. The supervision, however, of the officers appointed by the City, to prevent its sale, have no temptation to forego their duty, on account of the free competition which exists, and that renders it dangerous and difficult, without detection, to offer such meat for public sale. The consequence is, that we continually read, in the public journals, of butchers being fined for this offence; and the proportion, therefore, sold to the public, is small compared with the general consumption.

The first and most palpable result of this system is, that the entire consumption of beef in Paris, which is but the type of all the large cities of France, is reduced to about 87 pounds per head per annum, whilst that of London amounts to about 104 pounds; the meat of the latter being almost wholly good wholesome ox beef, whilst that of the former consists of a large proportion of diseased and cow beef and veal, the cows being usually both milked and worked until they are past use for either. In the above statement, no account is taken of the sheep and pigs slaughtered in London, which would add at least from 38 to 40 pounds per head per annum to the general consumption.

But a more serious consequence of this system of the butchery of Paris is not generally appreciated, because it lies in the back-ground of the picture. This is the effect upon the general health and longevity of the population. By a comparative view of this question, as relating to Paris and London, it appears from official documents, that whilst in the latter city the mortality is gradually decreasing, in the former it is as steadily increasing. Thus, in London, the average proportion of deaths in ten years (from 1846 to 1855) has been 25 per thousand; and in 1856 it was only 22 per thousand. But in Paris, the average from 1831 to 1840 was 26; from 1841 to 1850, 28½; and from 1851 to 1855, 31½ per thousand! and this decrease in the duration of life is ascribed by the writer to the diminution in the consumption of animal food, the result of the present system.

Surely, if anything will open the eyes of the present astute ruler of France to the evils of the system pursued in Paris, it is a statement like the one we have given. We believe he has the welfare of the French nation at heart, and the cities of France, especially Paris, have engaged his anxious attention. How it is that he has adopted the present fatal system we cannot tell; but with the abundant evidence before him of its disastrous working, both upon the producers and the consumers of meat, we cannot believe that he will long suffer it to continue. The evils are too palpable to be overlooked, and the proofs of them too strong to be refuted. Both demand the immediate and serious attention of the French Government. The high price of meat alone, is enough to show that a change is necessary, both on account of the prosperity and the health of the population.

We have now before us a work devoted to the subject,* which estimates the general consumption of meat for all France at 7 kilos. (or 15½ lbs.) per head. In Paris the proportion of neat cattle slaughtered is stated to be 78,000 oxen, 18,000 cows, and 74,000 calves. For all France, in 1840, the estimated numbers were 492,000 oxen, 718,000 cows, and 2,478,400 calves; the latter being nearly the double in number of the two former. The reason ascribed for this destruction of animal food at the very source, is the extreme poverty of the farmers, which compels them to convert their produce into money as quickly as possible. We learn that the same system is still pursued, and the consequence is that few calves are reared, and the production of meat is continually declining, whilst the price of meat advances, and the consumption proportionally diminishes. The author also accounts for the inferior quality of the cattle sent to Paris by referring to the state of the law. "Under the system of *a tax per head* the butcher purchased by preference the finest cattle, finding it to his interest to do so in spite of their high price relatively as live meat. Now, on the contrary, his interest compels him to purchase only animals of the second or third quality. He pays the *tax on the weight*, and receives no advantage from the form or strength of the animal he purchases. On the other hand, the tax being uniform, as he finds in an ox of 500 kilos. as many pieces of each class as in an ox of 300, and as he cannot sell the meat proceeding from the first at one single centime more than that of the second, he has an evident interest in purchasing only animals of inferior quality, which cost him less alive, and afford him a better profit. He neglects, therefore, beasts of superior quality, or does not offer a price for them adequate to what they cost; which tends to discourage the breeding of finer races, and lowers the quality of the meat consumed on the great market of Paris. Under this regulation the consumption of cows continually increases, to the decline of that of oxen; and the mean weight of the latter, as well as their mean value, as continually diminishes."

Such is the state of butcher's law in Paris; and its effects upon the most important branch of good husbandry in general, and upon the health of the inhabitants of Paris in particular. Efforts are making to induce the agriculturists to adopt a better system; but until the law is altered or abolished altogether, it is impossible that any beneficial change can take place.

In the meanwhile France will become an importer instead of an exporter of cattle; for it is impossible under the present system either to improve the breeds generally, or to prevent decline in the production of cattle. All writers on the agriculture of France agree on this subject, as well as that the farmers of France are more disposed to invest their savings in fresh purchases of land, or in railway and other public stock, than in the improvement either of the soil or of the breeds of cattle. There are undoubtedly exceptions to this, but it certainly applies to the large body of farmers in that country, and is the bane of its agricultural prosperity.

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* "Question des Subsistances—solution, le pain à soixante centimes les deux kilogrammes;" &c.

ON THE PRODUCTION OF ANIMAL FOOD.[*]

[TRANSLATED FROM THE FRENCH OF "LE JOURNAL D'AGRICULTURE PRATIQUE."]

No one disputes the importance of the bovine race of animals, in connexion with the slaughter-house; nor, on the other hand, does anybody appear to doubt that we have taken a wrong course in that great question—the production of meat.

Both the consumption increases and the price advances continually. People are uneasy at this, and inquire the reason, which is very simple: Production remains stationary, and is not in accordance with consumption; and it has remained stationary because it is not sufficiently profitable to the agriculturist.

The remedy for so serious a state of things is not easy of application; for, in some degree, it requires the co-operation of every one, and, above all, the vigorous support of authority, which should have the sole power of effecting a reaction in the tendencies of the market.

The most liberal encouragements lavished upon the breeders of cattle would not be too much, at this time; and they should, undoubtedly, bring the consumption to modify itself to something like what it is in England, which is at once more profitable to agriculture and to the public health than what is taking place in France.

In France, the number of horned cattle amounts, in round numbers, to ten millions; that of cows being four millions, and of calves three millions. Of these latter they kill two-and-a-half millions per annum, which do not yield more than 30 kilogrammes of meat (about 66¼lb.) per head. We slaughter, besides, 1,500,000 head of large cattle; and this total of four million head yields four hundred million kilogrammes (886,070,000lb.) of meat.

In England, with eight million head, they slaughter only two million; and that number yields five hundred million kilogrammes (or 1,107,587,500lb.) of meat.

Yes: in France, four million head yield four hundred million kilogrammes; and in England, two million yield five hundred million kilogrammes of meat. The cause is that, in England, they kill neither so many calves nor so many old oxen; and it is this correct and skilful proportion that gives them an economic position much superior to that of France in this respect.

The first and most important of the encouragements to be given for the production of cattle is, an entire change in the present customs of the slaughter-house. "Freedom," they say, is about to succeed monopoly in the great market of Paris, and to respond to the incessant and just complaints of the consumers; which is good news. The freedom of the slaughter-house is as useful to agriculture as to the consumer; for it will suppress a part of those intermediaries who absorb too large a share of the price, and cause the consumer to pay too dear for the meat, whilst the producer sells it too cheap, and is, consequently, disgusted with the market produce.

Let us judge of this by the following statement, which is taken from official documents, and which shows that the average price of an ox weighing 350 kilogrammes (775lb.) of net meat is 814f. (£13 1s. 8d.), or per kilogramme 89c. to 90c (or about 4d. per lb.) Certainly, there is a considerable distance between this price and the selling price of meat; and if, as ought in justice to be the case, the greatest part of it accrued to the grasier, his advantage would be a powerful encouragement to production. But, besides the indispensable intermediation of the butchers, there are others of all sorts. There is the Pay Office of Poissy, which charges, besides an interest of five per cent. upon the loan granted to the butcher, a municipal right of 3c.; which led M. Chale to say, in his deposition before the Parliamentary Inquiry made in 1851: "The Pay Office of Poissy is an instrument with which the city of Paris takes 1,400,000f. from the pockets of the agriculturists, under the pretext of ensuring their payments, which they do not ensure at all." Next, there is the town due of 2c. per kilogramme, and the abattoir tax of rather more than 7c., making in all 15c. 3½ milles.

But still this is not all. There is, in consequence of the law which makes it imperative to bring all the animals to the markets of Sceaux and Poissy, intended for the supply of Paris, at least one purchaser at first hand, who forms the groups of cattle, and conducts them to the privileged market; but there are more frequently two, three, and even four intermediate dealers, whose exactions are not less than from 10c. to 15c. per kilogramme each. There are also the commissioners near the same markets; the guides, to show the way from Sceaux to Poissy, and from Poissy to Sceaux; the hay-merchant; and the lodging-house-keeper: and all these people have their share of the benefit that the consumer ought to pay to the producer. It also raises the price of meat from 6c. to 8c. per kilogramme, on the average.

I am aware that all these middle-men cannot be suppressed, but they may be considerably reduced in number; and they ought to be placed on a well-understood footing. Nor can the production of cattle make any important advance whatever until the agriculturist shall be fully satisfied and secured in this respect.

Light breaks in on every side, and the most interesting publications are applying the torch to those questions which the interest of the Paris butchers hold in voluntary obscurity. Documents abound; and we can obtain from them a knowledge of abuses of all kinds, which ignorance alone of the facts has suffered to exist to the present time.

It is to the parliamentary inquiry commenced in 1851—which the political events of that period prevented from being completed—to which is due the merit of the deep investigation of this question. The documents collected at that period are the basis and starting-point of all the publications which have since been issued. They display such a character of honesty and truth, that we have felt secure in quoting them; and they are found continually under the pen of every writer. One of these, amongst others, M. E. Blanc, in his "Mysteries of the Butchery," supports by that authority the result of his personal works. M. Blanc does not draw conclusions in favour of freedom; he would substitute one monopoly for another. But his statements are, nevertheless, interesting and instructive; and I shall borrow from him some of great importance.

The price of beef at Paris, in 1820, was from 55 to 60 cents. per pound; in 1841, according to the report of M. Boulay de la Meurthe to the Municipal Council, 70 cents.; and it has successively risen from that time to 100 and 104 cents. (or 10d. to 10d. 1-25th per pound)—an increase of 90 per cent. in thirty-six years, and that in spite of all the efforts of the Administration to reduce the price of meat, and a multitude of opposite measures contradictory and incessantly reviving, with the view of remedying the evil. "He has been assured that the butchers of Paris could sell meat retail at 10 cents. less per kilogramme than they purchase it, on account of the skin and other proceeds."—[Parliamentary Enquiry (French) of 1851, vol. i. p. 32). Now, the mean course of the averages of the markets this year (1857) quotes meat at 1 franc 40 cents. (1s. 2d.), and this price is imaginary—"because the butchers have an interest in raising fictitiously the price of live cattle, in order to justify them in selling dearer by retail."—[Report of M. Boulay de la Meurthe, 1841.]

Let us, however, accept the quotation of 1 franc 40 cents.; the average retail selling price has been 1 franc 98 cents., or 58 cents. (5¾d.) *more* than the cost price, instead of 10 cents. less.

The following is, under another form, the butcher's amount:—

		F.	C.	F.	C.
Cost price of meat				1	40
Selling price..	Retail price....	1	98	2	82
	Skin and other proceeds....	0	34		
Profit..............				0	92 cts.

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[*] Taken from the second edition of "The Principal Bovine Races of France, England, and Switzerland," by the Marquis of Dampierre.

But this is not all: we must now state the less palpable profits which accrue to this return of 2 francs 32 cents., namely—

1st. The coarse meat imposed upon the purchaser, *in spite of the regulations of the Prefecture of Police*, amounting to *one-fourth*, and more frequently to *one-third* of the weight; say 40 cents. per kilogramme.

2nd. The substitutions of one class for another, or the deviation of the general amount from the classes, 40 cents. per kilogramme.

3rd. The sale to the tallow-melter of the fat from the carcase (about 15 kilogrammes per beast); of the loose fat and skin, charged according to custom, at the price of the meat (1 franc 98 cents. per kilogramme), and thrown into the basket, then sold a second time (about 10 kilogrammes, at 1 franc 20 cents. per kilogramme). Total, 25 kilogrammes. Making a profit, on an average, of 49 francs 80 cents. per beast, or 1 franc 45 cents. per kilogramme.

4th. The sale of 20 kilogrammes of bone allowed to the butcher upon each bullock, and reckoned by the Prefecture of Police at 20 cents. per kilogramme, and which they sell at the price of meat (1 franc 98 cents).

5th. The kidneys and false-chines, the normal weight of which is 20 kilogrammes; to which must be added 20 other kilogrammes, taken from the first, second, and third classes.* The whole sold at 3 francs per kilogramme.

6th, and above all, we must reckon the skill with which the meat is managed, so that there never remains a morsel for the fourth class, and but little in the third; by which it is estimated that they gain 1 franc per kilogramme on the fourth class.

Now, there is still the substitution of cow beef for that of ox; the difference in the price being from 48 to 50 cents. All the butchers kill cows, of which, on an average, 25,000 per annum are killed in Paris; and they are right in doing so, for that meat, although we say it, is as good, and often as fine, as that of ox beef, depending on the quality and health of the animal. We never, however, find any cow beef amongst the butchers; they scout, as an insult, the inquiry for it. The reason is, that cow beef is transformed into ox beef as soon as it appears upon the stall, and this fraudulent substitution constitutes an average net profit of 149 francs 54 cents per cow (or £6 4s. 2d.) on all that are killed.

With all these enormous profits, what are the expenses to be deducted? They are as follows:—

	fr.	c.	m.
The cost price	1	40	0
The municipal duties	0	12	34
The expenses of the stall	0	8	50
	1	60	84

These results are so important, that the skill of the butchers has been exercised successfully to conceal them up to the present time. It is high time to give a complete statement of them; for the profits accruing from them ought to be shared by the graziers, who, up to the present time, have been simple enough not to lay any claim to this fifth quarter (*cinquieme quartier*), which nevertheless amounts to 126 fr. 90 c. per head, or 36 c. 78 m. per kilo., upon 345 kilos. of ox beef; 75 fr. 90 c. per cow, or 3 c. 45 m. per kilo., on 220 kilos. of net meat; 29 fr. 30 c. per calf, or 45 c. per kilo., on 68 kilos. net meat; and 11 fr. 60 c. per sheep, or 64 c. per kilo., on 18 kilos. of net meat.

This mysterious fifth quarter does not amount to less than from 18 to 20 millions of francs profit per annum to the Parisian butchers alone. Judge then of its importance to the grazier!

The calculations which attribute an average profit of 34 cents. per kilo. (3½d. nearly) as the result of this fifth quarter, are based upon the average of 1856. Those of 1857 are higher, and exhibit an increase of 22 fr. 10 c. per ox, 14 fr. 95 c. per cow, 6 fr. 33 c. per calf, and 2 fr. 22 c. per sheep. They consequently increase proportionally the profit, estimated too low at 34 c. per kilo., raising it 36 c. 78 m. for ox beef, 34 c. 5 m. for cow beef, 45 c. for veal, and 64 c. for mutton.

In order to complete this useful information for the graziers, we give the prices in the actual returns of the several parts of this calculation.

	fr.	c.
Ox Beef.—The skin, average weight 47½ kilos.	58	90
Tallow and fat „ „ 50 kilos.	56	0
Offal (lights, liver, spleen, brain, tongue, gall, and paunch)	12	0
Total	126	90
Cow Beef.—Skin, average weight 35 kilos.	45	50
Tallow „ „ 20 kilos.	22	40
Offal (as before)	8	0
Total	75	90
Calf.—Skin, average weight 7½ kilos.	16	50
Tallow „ „ 4 kilos.	4	80
Offal (head, tongue, brain, sweetbread, pluck, and stomach)	8	0
Total	29	30
Sheep.—Skin in the wool, mean value	6	0
Tallow, average weight 3 kilos.	3	60
Offal (head, tongue, brains, feet, kidneys, and stomach)	2	0
Total	11	60

All these figures are taken from authentic sources. Let us consider what an enormous bearing they have upon production. We would wish that in this point of view it may attract serious attention; and that, when once delivered from the monopoly, means may be found to make the butchers pay for all those parts which have a value as high and real as the meat sold to them.

Let us now see what influence the price of meat has upon consumption, and especially on the qualities consumed. An English work, "*The Night Side of London*," has published some very interesting statistical documents on the consumption of London. There are eaten in that city annually 277,000 oxen, 30,000 calves, 1,800,000 sheep, 35,000 pigs, &c. On this statement M. E. Blanc makes the following reflections:—

"If we refer to the consumption of Paris, we find that that annual average consumption, for a population which amounts to only half that of London, is 88,000 oxen (only one-third of the consumption of London), 77,000 to 80,000 calves (nearly two-thirds more than are consumed in London), and from 20,000 to 25,000 cows, &c.

"Now, reducing these classes to kilogrammes, we find the following differences between the alimentary conditions of the two capitals:—

"The 277,000 oxen of London, superior in weight to those of the French oxen, and weighing in net meat a minimum of 400 kilos., allow for the 2,360,000 inhabitants of that city 47 kilos. per head; and the 30,000 calves, a food destitute of all nutritive qualities, 86 grammes only.

"The 88,000 oxen of Paris, on the contrary, weighing on an average 345 kilos., allow to the 1,200,000 inhabitants of that city only 25 kilos. 300 gr. per head; and the 77,000 calves 5 kilos.; which makes a difference in favour of the population of London of 24 kilos. 70 gr. of beef per head, and a difference in favour of the population of Paris of 4 kilos. 14 gr. of veal—the former being *substantial*, and the latter *unsubstantial* food.

"These statements explain why the work of which we speak thinks itself authorized to say, that '*London is the city in the world where they live the longest. In ten years the average of deaths has been* 25 *per thousand; and in* 1856 *that proportion was reduced to* 22 *per thousand.*'

"If, in order to complete the comparison, we consult the mortuary statistics of Paris, we find in them, by the statements of the English work, a sad contrast in the constant progression in the deaths, the average of which was, in 1831 to 1840, 26 per thousand; in 1841 to 1850, 28½ per thousand; and in 1851 to 1855, 31½ per thousand.

"Perhaps the price of meat at these different periods will explain to us the cause of this deplorable mortuary progression."

"From 1831 to 1840 meat sold at the stall from 60 to 65 cents. (6d. to 6½d.) per lb. It rose from 1841 to 1850, to from 70 to 75 cents.; and we have seen, from 1851 to 1855, and afterwards, it has attained a rate assuming from day to day more of a prohibitory character.

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* By the law in France, the butchers are bound to divide their meat into four classes, and sell it, according to the quality, at a certain price, fixed by the Prefecture of Police.—[Translator.]

"Is it not expedient here to recall that fearful declaration made before the Commission of Inquiry of 1851, and quoted in page 101 of this work, that *when the consumption of meat decreases*, THE MORTALITY INCREASES IN AN ANALOGOUS PROPORTION?"

We have here certainly matter for serious reflection, and motives for endeavouring to bring back the production and consumption of cattle, that source of public health, to conditions equitable for all.

Could agriculture produce meat in a profitable manner, by producing more, and at the same time considerably diminishing the price to the consumer? Certainly yes; but, in my opinion, three conditions are necessary, in what relates to the butchery of Paris, and these measures would have an immediate and decided influence upon the butchery of the rest of France, which, without reaching the impositions of the Paris butchery, tends to copy its proceedings in its own. These three conditions are as follow:

1st. Free-trade for the butchery—that is, competition. A vigilant authority may, by measures more efficacious than those which now exist, survey more closely the quality of the meat. It could not make the matter worse, in any case, however evidently disposed to do so; for fraud has been introduced everywhere, and the existing monopoly lives only by the violation of the laws and regulations which govern the matter.

2ndly. The suppression of all the middle-men and all the duties which are placed between the producer and the consumer. Let there be only the butcher, and the municipal and abattoir charges, reduced to 5 or 6 centimes.

3rdly. The creation of one market only, within reach of Paris, and thereby the suppression of the 8 or 10 centimes which tax the meat of animals usually driven from Sceaux to Poissy, from Poissy to Sceaux, or from Sceaux or Poissy to Paris, to the great injury of their health, their weight, and the quality of their meat. By this arrangement, again, we might look for a more strict and real attention than that which a director of Abattoir intimated in the following terms in the Legislative inquiry of 1851:—"It is certain that the inspection of the markets is completely illusory; for the inspectors inspect nothing at all. They do on the market just as they please, and the public find in it no guarantee. There come animals in the most deplorable condition; the inspectors never see them; and then even if they did see them, it is a question whether they would prevent the sale of them."

The establishment of a single market, and within reach of Paris, might involve other desirable measures; for instance, the verification of meat, which every one declares to be of a quality frequently wretched; and by this means the prevention of the entry into Paris of *dead meat*, or that of animals killed beyond the Barriers, most frequently diseased, and killed clandestinely. The consumption of meat under such circumstances assumes a frightful proportion; for in 1856 it reached the amount of 17,150,000 kilos., being a third of the consumption of meat proceeding from the Abattoirs; whereas in 1818 it was only 866,000 and in 1846 4,658,000 kilos.

All meat which has not passed under inspection alive ought to be proscribed: it is the only means of insuring a healthful alimentation.

Such is the state of this great question of the butchery, so important in all points of view for agriculture, and so worthy of engaging the attention of all reflecting men.

E. DE DAMPIERRE.

PRESENTATION OF PLATE.

TESTIMONIAL TO MR. R. T. BECKETT, OF TARPORLEY.

On the occasion of the rent-day in December last, in connection with the estates of Sir Philip de Malpas Grey Egerton, Bart., M.P., a general feeling was expressed by the tenantry that some mark of their appreciation of the honest, courteous, and exemplary conduct of Mr. R. T. Beckett, the agent, was called for; and no sooner was the sentiment expressed, than arrangements were made for bringing such good wishes into a tangible shape. A committee to obtain subscriptions and arrange details was formed, consisting of Mr. J. Vernon, of Willington (chairman), and Messrs. Warburton and Barnes, of Eaton; Messrs. J. Barker, Finchett, and H. Siddon, of Rushton; and Mr. Rigby, of Fenna Wood. Mr. William Vernon was appointed secretary. The intentions of the committee were at once announced, and tenants on the Oulton, Broxton, Astbury, and Upton and Chester estates, all came forward with their contributions from £2 to 1s., to pay a tribute of respect to the man who for 23 years had discharged the onerous duties of land-agent with fidelity to his employer, and at the same time with benefit to the tenantry. So unanimous was the feeling, that in a week or two £140 was subscribed; and to add to the general gratification, Sir P. Egerton expressed his hearty approval of the whole proceedings. After some little consideration, the committee determined that the testimonial should consist of a handsome, but useful collection of silver-plate. The articles comprised a dozen silver table forks, a dozen dessert ditto, a case containing a dozen dessert knives and forks, four silver tablespoons, two gravy ditto, massive soup ladle, salt cellars, knife rests, cruet stand, liqueur frame, bread basket, cake basket, a richly chased flower-bordered salver, an elegantly embossed kettle and stand, a dozen Queen's pattern teaspoons, and a splendid gold watch and chain. A purse containing 30 guineas was also added to the above-mentioned articles. Accompanying the present was a beautifully emblazoned and engrossed list of the articles, and also the names of the various subscribers to the testimonial. On the kettle, salver, and watch, the following inscription was engraved—"Presented, with other pieces of plate, by the tenantry of Sir Philip De Malpas Grey Egerton, Bart., M.P., to Mr. Richard Trim Beckett, as a token of their admiration of his courteous conduct, and of their high regard as an honest and efficient agent for the last twenty-three years. 10th February, 1858." The ladle, spoons, &c., each bore some part of the inscription, denoting that they formed portions of the testimonial.

In order that the tenantry generally and the friends of Mr. Beckett might have an opportunity of paying their personal respects on the occasion of presenting the plate, it was decided that a dinner should be held at the Red Lion Inn, Eaton, near Tarporley, on Wednesday last. Early in the day, the indefatigable secretary, Mr. Wm. Vernon, had tastefully set out the articles of plate in a small room at the Red Lion, where they were inspected by nearly 300 of the ladies, gentlemen, and labourers living in the neighbourhood. At two o'clock

THE DINNER

took place in the large room of the inn, when about 90 of the tenantry sat down. Amongst the company present we noticed Mr. John Vernon (chairman), Mr. R. T. Beckett, Mr. Beckett, and Mr. W. Beckett, Northwich; Mr. Moss, Shaw Farm; Mr. Hicklin, Chester; Mr. Brown, Broxton; Messrs. Baddeley, Leadbeater, Robinson, and Bivy, Astbury; Messrs. Bithell and Beecroft, Upton; Messrs. R. Taylor, Rigby, and Hyne, Little Budworth; Messrs. W. C. Warburton, Barnes, Law, Ruscoe, Finchett, and Barker, Eaton; Messrs. Bebbington and Siddon, Broxton; Mr. Shrigley; Mr. Johnson, Egerton Hall; Messrs. Hitchens and Bretley, Rushton; Messrs. Ellwood and Rowe, Kelsall; Mr. Davies, Egerton; &c., &c.

After the dinner had been disposed of, the Chairman proposed the usual loyal and complimentary toasts; after which the health of Sir P. Egerton (the landlord) was drunk with three times three.

The testimonial was then placed by Mr. Butt in front of

The CHAIRMAN, who rose and said—Mr. Beckett, the committee formed for the purpose of providing some substantial memorial to mark the high estimation in which you are held by the tenantry of Sir Philip Egerton, have done me the honour to appoint me their chairman, in which capacity I now stand. Proud I am of the duties entrusted to me, though very far from being able to discharge them in a manner that I would wish; but I am quite sure you will excuse me when I say you must take the feeling of the heart for the will of the mind. During the time you have been amongst us, which now extends over the long period of twenty-three years, we have had very many opportunities of witnessing the unremitting care and attention with which you have discharged your important duties as agent to our worthy landlord. I can say from experience, when you have seen it needful you have not been backward, with the kind consent of your benevolent master, to render us every assistance in your power; and now, sir, on behalf of my brother-tenants, whose names are herein written, I beg your acceptance of the accompanying testimonial as a mark of the esteem we bear towards you, and also as a small return for the many acts of kindness you have done us, and for the uniform good feeling and gentlemanly manner with which you have treated us; and we hope and trust that your valuable life may yet be spared many years to us and to your esteemed wife and family, and that you may be permitted by a gracious Providence to pursue your career of usefulness in the enjoyment of every blessing this world can bestow. And when declining years come on, may you view that tribute of respect with delight, and say "I have won those for an example to a rising progeny and ages yet unborn;" and when it pleases God in his infinite mercy to call you hence, "may you die the death of the righteous, and may your last end be like his." And now, gentlemen, I call upon you to show your further wishes to our worthy guest by filling a bumper to his good health, with the honours due to a hearty good fellow.

The toast having been drunk amid enthusiastic cheering and musical honours,

Mr. Beckett rose and said: Mr. Chairman and Gentlemen, I rise with no ordinary feelings of gratitude and pleasure to receive from your hands this valuable testimonial, as a mark of the estimation in which you hold my conduct and services as land-agent to Sir Philip Grey Egerton. More than 23 years ago I entered upon that appointment with the highest gratification, and I soon found that I had to work with an intelligent and improving class of farmers, who only required confidence and encouragement, not dictation. I also found, as I expected, the nobleman whom it was my duty to serve and represent, to be a most liberal-minded landlord, whose greatest desire and happiness was to improve the condition of his tenantry, to make their homes comfortable and condition prosperous. I further found in Sir Philip Egerton's professional agent, Mr. Humberston, the present Mayor of Chester, a most gentlemanly and agreeable adviser, easy of access, and always at my right hand whenever I required advice. Under such circumstances, and with such advantages, it was no difficult duty for me to sail smoothly with you in all matters connected with a land-agency. My course has been as smooth as an unruffled sea. I am proud to say that I have never had to encounter a head-wind or a stiff gale; nor do I yet see any breakers ahead, except the chance of a break-down in my attempt to acknowledge your great kindness on this occasion. While the brilliancy of your magnificent testimonial dazzles my eyes, my heart throbs with gratitude which I cannot fully express. I value it for its intrinsic worth, but still more because it comes from a respectable disinterested tenantry, with whom I have had the honour to act for so many years. I little thought when I entered upon my stewardship, that the 1st October, 1834, would be the harbinger of such a day as this. I thank you all most sincerely. I thank also my absent friends, the tenantry, who have contributed to this testimonial, which I shall endeavour to hand down to my children as unsullied as I receive it at your hands. May health and happiness attend you and your families, and may the tenantry of the House of Oulton always be as united and prosperous as their warmest friends can desire; and believe me that amongst those friends you have none more sincere than Sir Philip Egerton your landlord, and your humble servant his land-agent. Mr. Chairman, I beg leave to thank you individually for the kind and flattering manner in which you have been pleased to present this testimonial; also to you, gentlemen, for the patient hearing you have given me, to enable me most inefficiently but most sincerely to acknowledge the high compliment which you have paid me.

The health of Captain Egerton was next drunk.

Mr. Hicklin, in a speech expressive of the pleasure he experienced in seeing so good a feeling existing between landlord, agent, and tenantry, proposed "Success to the Flail and the Plough."

The healths of Mrs. Beckett, the Vice-Presidents, the Committee, the Secretary, the Press, of Mr. Butt, and thanks to him for his exertions to obtain so handsome a testimonial, with other toasts, were proposed and duly responded to, the entire company enjoying the occasion in a happy, convivial manner.

THE GUANO TRADE A MONOPOLY.

As a convention of the Peruvian Legislature is now sitting at Lima, as to the future disposal of guano, whether it is to be continued as a monopoly in the hands of the present consignees, Messrs. Baneda Brothers for the United States, Anthony Gibbs and Son for Great Britain, and the agent for France and the continent; or opened for free sale at the islands, it may be interesting to know a little of the trade and of the immense profits made by the consignees. The shipments to this country and England for 1854, being in round numbers 163,000 and 200,000 tons (those to the continent not included), will show the great interest the consignees have in continuing things as they are, and the necessity of our citizens and the English exerting themselves to open the trade to the public:—

SOLD IN THE STATES IN 1854.

	dolls.
163,000 tons at 55 d., 8,965,000 d.; com. 5 per cent.	448,250
„ freight 20 d., 3,260,000 d.; com. 2½ „	81,500
The consignees get this on all charters, no matter how many ship-brokers are interested in the other half.	
Estimating 163 vessels as loaded, and that 3,000 ds. were drawn for disbursement, the profits on advances of Peruvian dollars, worth about 75 c.	125,000
	654,750
Messrs. A. Gibbs and Son, in proportion, would amount to..............................	813,000
There are other commissions on advances, storage, &c.	

Memorials had been presented by the British landowners, farmers, shipowners, and merchants to the government, to use their influence to have the monopoly so injurious to the public good done away with; but hitherto their exertions with the Peruvian government have been unsuccessful. However, there is now a hope, as the Peruvians think a change ought to be made. The ministers of both countries should render their assistance for so desirable an object.

Though freights have fallen considerably since 1854, the price of guano has been raised from 55 dols. to 62 dols.

When at the Chincha Islands a few years ago, Mr. Elias had the contract for shipping, at nearly a dollar over the tender of Mr. Lloyd, though backed with good security. This would be a charge extra of 400,000 dols. a-year to the farmers, estimating the annual shipments at that amount. The vessels were then delayed a month, by having to enter and clear at Callao.

In 1851 the price of guano, with higher freights than at present, was 45 dols. This year the English agents attempted to raise the price to 70 dols., being 8 dols. over the rates here, though the charges were the same; but it failed, owing to the *Mark Lane Express* calling the attention of the farmers and the trade to its injustice. 500,000 tons could be annually shipped from the islands, which at 20 dols. would give a revenue to Peru of 10,000,000 dols. (less the shipping charges), and with 20 dols. freight would make guano stand 40 dols. afloat, instead of 60 dols., as under present management.

This is a question of importance to the farmers of the world. —Hunt's (American) Merchants' Magazine.

THE CULTURE OF SHEEP.

A LECTURE BY MR. ROBT. SMITH, OF EMMETT'S GRANGE, SOUTH MOLTON, DEVON.

On Monday evening, Feb. 22, a lecture was delivered by Mr. Robert Smith, of Emmett's Grange, South Molton, Devon, in the new lecture-theatre of the South Kensington Museum, on "The Culture of Sheep," being the last of a series of six addresses to working-men, and intended to explain the collections of the animal kingdom in the museum. The attendance was very large, there being at least 500 persons present. The lecturer produced a great number of pictorial sketches of the various breeds of sheep, English and foreign, which added materially to the interest of the lecture; they being frequently referred to in elucidation of the subject.

After some introductory observations—in which Mr. Smith spoke of the advantages offered to working men in that institution, and observed incidentally that in going over the museum he had found that the collection of specimens relative to the culture of sheep was incomplete, and that he would do what he could to supply the deficiencies—the lecturer proceeded to bring before the audience the subject of his lecture. The culture of sheep was, he said, a branch of their rural and national economy which had not as yet received that degree of public attention which was due to it. As a rural occupation it was the foundation of all good husbandry, and in a national point of view they looked to it as a means of employment for thousands of their artisans, and as an important source of food and raiment for an increasing population. They found from history that sheep had existed at the earliest periods in every quarter of the globe, from Iceland to the regions of the torrid zone; but they had been most cultivated in Europe—especially in Germany, Spain, and Great Britain; and not only had the cultivation of sheep in this country recently outstripped that of every other country, but they were daily witnessing a new and important auxiliary in the culture of sheep in the British colonies. As he had already intimated, sheep were found in every quarter of the globe. Thus they were to be met with in every variety of climate, adapting themselves to the vicissitudes of heat and cold. In each country they were cultivated according to the wants and tastes of the people, whether for food, clothing, or the uses of commerce; but when left to themselves, under the operation of Nature's laws, they represented every form of carcase and clothing which corresponded to or fitted them for the particular climate and country in which they existed. Sheep when in a wild state preferred to range at large on open plains, and displayed considerable sagacity in the selection of their food. They herded together in small flocks, and were in general active, swift of foot, and easily frightened by dogs or men. When completely domesticated, the sheep appeared as stupid as it was harmless; but when left to depend upon itself for food and protection, it exhibited a more decided character. Under such circumstances a ram had been seen to attack and beat-off a formidable dog. On the approach of storms they retired for shelter to the spot which they knew from experience to be most adapted to afford it. Of all the domesticated animals of Great Britain, the sheep was of the greatest consequence both to the farmer and to the nation—to the farmer, because it was raised with ease and in situations where other animals could not exist, and generally made a better return for the quantity and quality of the food consumed than any other animal; to the nation, because it supplied a staple article of food and raiment, and at the same time afforded employment to an immense number of artisans. The culture of first-rate sheep was a "science blended with practice;" and consequently a proper knowledge of Nature's laws, more especially as regarded the effect of climate and situation on their character, had led to important improvements in their form, quality of flesh, and general management. It must not be forgotten that the sheep of the present day were, in fact, the production of man's skill and enterprise in their propagation from their original wild state. From this it might be inferred that were the breeders to relax their exertions, leaving the animal again to Nature's course, the various flocks would soon degenerate. Let them fancy for a moment such a state of things. Where then would be the advance of commerce or the increasing production of meat for an increasing population? Happily for the English nation, however, there was no cause to fear that this picture would ever become a reality. In every point of view "the culture of sheep" deserved to be esteemed one of the principal branches of rural economy, and claimed the attention of the artisan, the manufacturer, and the State. Now he must confess at the outset that he was not so familiar with foreign breeds of sheep as he was with English breeds; and therefore on that part of the subject he must call in the assistance of a very able work by Mr. Youatt. He should afterwards speak of what he himself was familiar with. The sheep which was handed down to us from time immemorial was a horned sheep. [The lecturer here referred to a picture of the original breed.] As he had before intimated, sheep were transformed in the process of propagation, by means of certain rules which were known to the breeders, and that the original breed should have been transformed into the sheep of the present day [pointing to specimens of the latter], showed how great an art was the culture of sheep. He was indebted to Mr. Davis, the Queen's artist, of Church-street, Chelsea, for the paintings and pictorial specimens before them; and when he told them that gentleman had executed the whole of the sketches since 11 o'clock that morning, they must feel he had lost no time. After referring to a representation of the Russian sheep, the Wallachian sheep, and the fat-rumped sheep, as affording illustrations of the original breed, and also to a picture of a black-faced Scotch sheep for the same purpose, he alluded to the fat-tailed sheep of the Cape, and remarked, in passing, that the tail of this sheep was esteemed so great a luxury in its native country, that it often sold for more than all the rest of the carcass. He then mentioned the Cyprus sheep, known by its spiral horns, and the Moufflon sheep, which inhabited Iceland, and resembled our deer. There were also the Asiatic argalia, the American argali, and more particularly the Merino sheep, of which he would speak at a future period of the lecture. Before he proceeded any further, he said, he ought to remark that the fine-woolled sheep were produced in dry warm countries, while strong-coated sheep were produced in wet cold countries; the coat being, in fact, adapted to the climate. From this it followed, that if the finest-woolled animals were introduced into this country, they would die away; while sheep of the opposite description might be expected to thrive. After illustrating and explaining the foreign breeds, their localities and habits (which was an interesting part of the lecture), he would not trouble the audience with any further remarks on foreign sheep, but would proceed to speak of their own sheep. Of course England in the earliest periods of her history resembled all other countries under similar circumstances. There was nothing but bleak hills undrained plains, and wild commons; and over these uncultivated lands were found no animals but such as were in a corresponding condition. But in the course of time desolation gave way to improvement; the hills and plains were cultivated, drainage was to a certain extent effected, and with the improvement of agriculture there was a corresponding improvement in the breeds of sheep. He would first speak of the native horned sheep as originally known in this country. That picture [pointing to one] represented the old black-faced mountain sheep of Yorkshire. That animal had disappeared before the plough, and the farmers of that part of England had placed on their lands a much better kind of animals. There, again [pointing to another specimen], was the Dorset long-woolled horned sheep. Generally speaking, all the inferior breeds had given way to the better breeds; but here was an exception—the Dorset sheep remained, and the reason of this was that the lambs were produced two or three months earlier by that breed of sheep than by any other. The inferior Dorset sheep were preserved in order that the luxurious might have lamb out of season (laughter). They had no doubt all heard a great deal about the Welsh sheep [pointing to a sketch of this breed]; those sheep were fed on the waste hills of the Principality. If the hills could be cultivated, there would be a proportionate improvement in the breed of sheep; but as there appeared little prospect of that, the animal would no doubt continue in its present condition, and he need scarcely say that the Welsh sheep were altogether a naked lot (laughter). He now came to the Old Norfolks, the sheep improved by the late Lord Leicester, better known in those days as Mr. Coke. When Lord Leicester first began his career as an agriculturist, in Norfolk, he found nothing but sandy downs and a race of hardy and inferior sheep; but now the sandy downs had become fertile fields, and there was no part of the country which exhibited greater improvement, whether as regarded the cultivation of the land or the breeding of sheep. The sheep of which he had spoken had now disappeared, having been supplanted by the improved South Down of Sussex. Then as to the horned sheep. These were peculiar to the dry lands of England, it being on the moist pasture of the country that that description of animal did best. If the cultivator could get enough within five or six years from the wool and the price which he ultimately obtained for the carcase of his "old mountain wether," he was generally satisfied. He had now to refer to what were once the marshy districts of England, but which were now reckoned among the most fertile agricultural and grazing districts of the country: he referred especially to the Lincolnshire marshes. That county might be regarded as one of the best pasture districts in the kingdom. The sheep there were exposed to the eastern winds, as they fed on the low grass lands; and consequently the animals which were most adapted for that district were robust animals—animals which had a large amount of bone and fleece. He was able to speak on this subject with the greater confidence, because Lincolnshire happened to be his native county, and he resided there for a considerable portion of his life. The old Tees-Water sheep was almost a fac-simile of the Lincolnshire sheep. [The pictures of both were referred to in support of this statement.] There [pointing to a picture of a group of sheep] was a representation of the Merino. It was a sketch made by Mr. Davis, of some Merino sheep which were introduced into England by George the Third, with a view to their propagation. Notwithstanding the king's patronage, the farmers of the day would not have these foreign sheep thrust upon them; the carcase not being one that would pay, and almost the sole use of the animal being the production of fine wool, to be mixed with the coarser wools. There was a fac-simile of this breed of sheep on Exmoor Forest; and this suggested to him that though the Spaniard had propagated this animal chiefly for his wool, it might have come originally from the mountain. The Merino was a very hardy animal, its wool was remarkably thick and fine, and it was altogether a very respectable sheep (laughter). It had occurred to him that the Exmoor sheep might be mixed with the Merino to advantage; not that English farmers would consent to admit the Merino in order to improve their own sheep; but he thought their sheep would improve the Merino, by giving them more lean meat and length of wool. There [pointing to a picture] was a brown animal called "the Syrian sheep," which was a sort of Cape sheep with a long tail. This reminded him of a very interesting fact, namely, that the sheep of the earliest ages, besides being horned, were in many cases coloured. In tracing the records of history, relating to this subject, he found mention made of black sheep, brown sheep, speckled sheep, mottled sheep, and so on. So also in the present day, agriculturists sometimes saw among their flocks black sheep, grey-faced sheep, grey-legged sheep; while there was also an occasional appearance of horns. Now he felt that he had not said enough about the Merino sheep. The Spaniards and the Germans had propagated the Merino on account of the fineness of its wool. It is this kind of sheep that has been found to be most suitable for our Australian colonies. The Southdown sheep had been tried there, but had not been found to answer so well, because it was, in fact, a wild mountain sheep. In Australia, land being for the most part of little value, and rents merely nominal, an immense quantity of sheep were kept ranging over vast tracts of country; and up to a recent period, if the shearing from time to time fulfilled the expectations of the grower, he was amply repaid. Since the discovery of the gold diggings, however, and the vast increase of population, there had, of course, been people to feed as well as fine wools to be produced. In fact the people of Australia had already found themselves rather in a dilemma for want of mutton; and it might be worthy of consideration whether it would not pay some Australian agriculturists to come over here, and pay him (the lecturer) a good price for specimens of his mountain Exmoor sheep (laughter.) Now among the old English breeds that remain, there was the Dorset sheep, which was preserved, as he had stated, on account of the early lamb; the Welsh sheep, which did not appear at all likely to be improved; and the Scotch black-faced Sheep. This last sheep resembled the Russian sheep, and belonged, no doubt, to the same family. It was a very useful animal, chiefly for this reason that it lived and throve where no other breed of sheep could do so. Then there was the Exmoor sheep, which he begged to say had not disappeared (laughter), but, on the contrary, was as thriving as ever. Next there was the old Scotch white-faced horn, which, in consequence of the improvement of the black-faced sheep, and the very rapid march of the Cheviot sheep, was altogether out of date. Then there were the old Ryelands, natives of Worcestershire, Herefordshire, &c. On this subject he remarked, that it was not unlikely that the late Mr. Bakewell received considerable aid from the Ryeland sheep. Mr. Bakewell never explained to English breeders the course which he pursued, as they could have wished him to do, by leaving as a legacy to future generations the descriptive art of producing such a newly established breed as *his* Leicesters. He thought he obtained them originally from the Ryelands sheep. In fact [pointing to pictorial sketches of Ryeland and Leicester sheep] there we have the portrait of a Ryeland ewe, and another of a Leicester, as first improved by Mr. Bakewell. I must say, I think them so alike, that I was about to say I see no difference. A representation of one of Mr. Bakewell's sort of sheep was given in the *Farmers' Magazine*, published by Messrs. Rogerson and Tuxford, of the Strand. Many breeders thought that animal—a ram bred by Mr. Inskip—an exceedingly good one, and many ventured to assert that there never was so good an animal before, and never would be so good a one again. Mr. Bakewell produced a particular kind of animal—an animal suited to his own particular taste. At the outset he bred his sheep for form and symmetry, quality of flesh, fineness of wool, but regardless of weight. After a few years, when he had arrived at a certain state of cultivation, however much he might be admired by his friends the Leicester breeders, there were others who did not view the matter in the same light. These persons did not feel that the head required to be made smart, or the wool fine, or the bone less; they therefore resisted the new theories, and, as is stated by Mr. Youatt in his book, Mr. Bakewell was at first unsuccessful in the letting his sheep; but in after years it happened that men's minds began to change: lest the whole cultivation should be monopolised by that gentleman, a society consisting of eight breeders was formed to obtain the first pick of his flock. In the fall of the year each of these gentlemen selected a male animal, so that Mr. Bakewell's sheep were distributed as it were over the country. There was another breed of sheep which he had not mentioned, namely, the Romney Marsh sheep. This was a wild, bony, coarse animal, and he believed it had disappeared. There was another sheep, of an intermediate character, called the Devonshire Nots, a variety between the Exmoor horned sheep and the Leicester, and a very hardy animal. This was found among the high hills of North Devon and West Somerset: it was an animal which was about half way between the highly-cultivated sheep and the mountain races, and, occupying an intermediate position, was exceedingly useful in certain districts of the country. He now came to the short-woolled sheep. A black-faced short-woolled sheep was found scattered over a great many of the southern counties. Here, for example [pointing to a specimen], was a black Norfolk sheep. This afforded an illustration of what he had said before with regard to the influence of climate. Here they had changed the Old Norfolk for the Southdown sheep in the dry eastern counties of England. Then they had the Southdown on the dry southern soils, and distributed over many intermediate spaces of dry and healthy sheep-lands—which the lecturer explained, grounding every argument upon climate and improved cultivation. The Leicesters inhabit the midland counties and intermediate lands between the extreme dry and extreme moist climates of our island, the long-woolled sheep being exposed to the colder aspects, where the short-wool or pure Leicester could not exist. The localities and habits of the several breeds were then enumerated by reference to a map of England and Wales, which had been prepared by the authorities of the Institution for the purpose of illustrating the lecture. In turning to Scotland, he would remark that such was the effect of altitude that he would illustrate it in this way, by reference to a hilly district: for instance, at the foot of the hill was to be found the cultivated Leicesters, then the mixed Leicester and Cheviot, a stage further up they found the Cheviot sheep, then the mixed black-faced and Cheviot cross, and next we find the black-faced ewe, and lastly the black-faced wethers, which it was said no weather could destroy, unless blown over by a tempestuous gale (laughter). Tracing the course of the different breeds on the map, he observed that they had here long-wools, middle-wools, and short-wools. The long-wools were to be found in Lincolnshire, Yorkshire, Kent, the Cotswold-hills, and some parts of the midland counties; the middle-wools were to be found in Dorsetshire, Devonshire, Leicester, Rutland, Nottingham, &c.; while among the short-wools were the very popular Southdowns, West Country-downs, Norfolk-downs, Hampshire-downs, and Shropshires. The latter breed, he might observe, had come very rapidly into public favour, and he must confess that as an old breeder he was astonished to find them cultivated to so high a pitch, and carrying off, as they had done, prizes at our national shows. In like manner (and this is extremely interesting) there was now a new breed of sheep, called the Oxford Downs. Thus, it would be observed, were agriculturists in various districts endeavouring to propagate sheep which were peculiarly adapted to the climate and situations of their several districts. This was very important as bearing on the state of the sheep culture at the present day. The truth was that there had been eminent breeders of sheep as well as eminent men in other departments of industry; we have had our Ellman, Grantham, Bakewell, Collings, Culley, the late Duke of Bedford, Lord Spencer, Lord Leicester, &c., of the past age, who did their duty in thus handing down to us our present established breeds—breeds that have been cultivated from these indigenuous and mountain races here [pointing to the pictorial sketches]. This stage of improvement was received by men of the present generation, who have succeeded to admiration in carrying on this great work of art by propagation. Our country stands indebted to such men as Jonas Webb, the Duke of Richmond, Overman, Sainsbury, Rigden, Grantham, &c., for cultivating the South Down; to Sandy, Pawlett, Creswell, Turner, Spencer, and others for the Leicesters; while the long-wools have been remodelled by the Clarkes, Kirkhams, Casswells, Richardsons, Brices, &c., in Lincolnshire; and by Large, Hewer, Garne, Wells, Handy, Brown, and Ruck, on the Cotswold and neighbouring hills. There are many other breeders who had long directed special attention to the improvement of their breeds of sheep; and, looking at the transformations which had been effected, [here the lecturer pointed to the original and the improved breeds represented in the pictures], he must say, that if credit was due to improvers in other departments of art and of industry, equal credit was due to the breeders of sheep for the ingenuity and talent which they had displayed in their vocation (cheers). Much of the improvement was due to the Royal Agricultural Society, which had offered prizes for the best specimens of sheep. But let it be remembered, that Mr. Ellman took in hand the improvement of the South Downs about a hundred years ago; and Lord Leicester, Mr. Bakewell, and some few others, achieved immense success before numbers were at all aware what they were doing. This, of course, had a close bearing on the production of the established breeds of the present day, early corrections being thus early stamped by their males. It must not be supposed that the race of attempted improvement was all sunshine. He could give the names of a dozen or perhaps twenty breeders who had not succeeded, especially in the breeding of rams. It was no easy matter to blend science with practice. He had already mentioned the failure of the attempt made by George the Third to introduce merino sheep into this country; and he had recently learned, from the published report of an

Australian agricultural body, that its sheep-breeding operations had proved by no means satisfactory. He then proceeded to speak more particularly of the *breeding* of sheep. Adverting to what he had said about the early lambing of the Dorset sheep, he remarked that lambs were dropped according to the uses and requirements of the several counties, as regards climate, food, and after-management to be pursued for realizing in the markets, and at what age they were to be sold. The mountain races, of course, did not drop their lambs until the cold season was gone by, so that the lambs could eat the early grasses as they first sprang up. He had not yet referred to the Cotswold sheep, which was a magnificent animal [Pointing to a portrait, he said, That is a draught of a Cotswold ram, belonging to Mr. Lane, which took the first prize at the Lewes Meeting]. After giving some local details of this breed, he stated that the lambing of this sheep occurred about March; so also did that of the Leicester sheep; but he might say again that the period generally depends on situation, climate, and the supply of food. One important fact was, that at the present time sheep were, in some of the best districts, sen to market at the early age of twelve, fifteen, or eighteen months. Formerly, scarcely any sheep were sent under three or four years of age; and therefore the public had to wait for their mutton (laughter). The truth was that in many grazing counties it was formerly, and even now, difficult to provide food for fattening them in the winter season: hence, the farmer fed his sheep on the richest pastures he could give them during the summer months, in order that he might be able to send them early to market in the autumn. Another very important matter in relation to the culture of sheep was warmth. He had before referred to this, in effect, in speaking of climate; but the subject of warmth was so important as to require special mention. On this point, he would read an extract from a lecture which was delivered by Dr. Lyon Playfair before the members of the Royal Agricultural Society, in the year 1842, the subject of the lecture being, "The application of physiology to the rearing and breeding of cattle." He must confess that, as a farmer and breeder, he listened to that lecture at the time, as no doubt many others did, with a predisposition to set down everything as mere theory; but subsequent experience had convinced him that what the doctor said was true. Dr. Playfair set out by saying, "It would be presumptuous in any scientific man, however exalted his rank in science, to endeavour to instruct an assemblage such as this, or to recommend illustrations in the practice of an art which he has learned in the closet and not in the field." He must say that that was his feeling at the moment. "But it may be permitted," added the doctor, "even to the most humble cultivator of science, to examine the practice which you yourselves have perfected, and to point out the laws of nature upon which that practice depends." Dr. Playfair afterwards went on to tell them, in regard to warmth, that it was up to a certain point an equivalent for food. He said, "The average temperature of the bodies of our cattle is about 100 degrees, or more than 40 degrees higher than the ordinary temperature of this climate. Hence there must be some provision in the animal body to sustain the heat which is absolutely necessary for the performance of the organic functions. The air, being so much colder than the body, must constantly withdraw from it heat, and tend to lower its temperature. Whence, then, comes the fuel for the production of the heat?" What the doctor said was, in other words, that the heat required by the animal's body being 100 degrees, when the temperature was below that the exchanges were against the animal. If the bodily heat was only 60, it must be made up to 100 by fuel. What fuel? Why food. Surely, then, breeders ought, for the sake of economy, to keep up the animal heat. The doctor quoted Liebig in confirmation of his views. "Were we," said Liebig, "to go naked like certain savage tribes, or if in hunting and fishing we were exposed to the same degree of cold as the Samoyedes, we should be able with ease to consume ten pounds of flesh, and perhaps a dozen of tallow candles into the bargain, as warmly clad travellers have related with astonishment of these people. We should then also be able to take the same quantity of brandy or train-oil without bad effects, because the carbon and hydrogen of these substances would only suffice to keep up the equilibrium between the temperature of the external air and that of our bodies." Dr. Playfair himself afterwards said: "The only use of clothes, in the abstract, is to economise food. They assist in retaining the heat of the body, and render less food or fuel necessary for this purpose." To this he (the lecturer) would add another illustration. If a man who had led an active life, and had been accustomed to exposure to cold, retired from business, and confined himself almost entirely to a warm room, he would get fat, simply because there would be nothing to lower the animal heat. After the publication of Dr. Playfair's lecture, in 1842, a prize was offered by the Royal Agricultural Society for the best essay on the management of sheep. He was himself fortunate enough to be the successful competitor; and at the end of the essay, which was published in the eighth volume of the Society's Transactions, would be found the results of twenty experiments which he tried in animal-feeding, which confirmed Dr. Playfair's views in reference to warmth. He would not trouble them by entering into any of the details of the experiments, but he would observe that the experiments all hinged upon the relative value of the different kinds of food which were given to animals. For instance, there was a comparison between the common white turnip and the swede turnip. They all knew that the common white turnip contained a very large quantity of water. In September, while the sun was still powerful, he found that the sheep would thrive very well on a given quantity of that vegetable; but when the sun's rays had become more oblique, and the temperature of the atmosphere was considerably lower, so that as the animal inhaled the surrounding air the exchanges were against it, he found that the animals fed on the white turnip made no progress; the fact being that such food did nothing but just suffice to keep up the animal heat. At this period, however, that was about Christmas, came in the swede, which contained a smaller proportion of water. Less of this was required to keep up the bodily temperature, and with care on the part of the farmer, the animal went on pretty well till the spring, when there was no longer any difficulty. He might further observe, that he put eight sheep in summer into two pens, four in each pen, and besides giving them all clover, he supplied one pen with a pint of beans per day, and the other with a pint of peas. It might be supposed that there would be little difference between the two as the result of this variation of diet; whereas in fact, the sheep supplied with the peas did very well; while those that had the beans, like horses that were overfed with the same kind of food, soon exhibited symptoms of inflammation, the beans being too hot for the body at that period of the year. At the conclusion of his essay he said, "Thus, after many anxious reflections upon the '*principle*' which 'science' has dictated, "practice" has shown it to be one of great magnitude, and to develop the mysteries of past ages by pointing out those elements of the vegetable creation best adapted to Nature's laws under the varied temperature of the seasons."

While he advocated warmth, he was very far from saying that animals should be shut up in places where the atmosphere was at 100 degrees, or where there was no adequate provision for ventilation. What he wished to point out was, that warmth had an important and necessary connection with the food which was given to animals. Having now said enough with regard to the breeding of sheep, he would say a few words with regard to sheep required as food for man. There was no other animal so important in this point of view as the sheep. Mutton constituted the grand staple food of this country; and hence, as he had before remarked, the improvement of the breeds had a close connection with the increase of population. The Royal Agricultural Society and the Smithfield Club had both exerted themselves in the field of improvement, by offering prizes and holding exhibitions periodically; and great success had attended their efforts. Similar exhibitions had recently taken place in France; but the result thus far was that the English breeders and graziers who exhibited sheep swept away the prizes, and, pocketing the money, walked away with it (laughter). As regarded the distribution of the meat, some preferred early lamb, and others preferred saddle of mutton with a black foot, and had to pay for the luxury; while others, again, having less money to spare, made a different choice. The whole thing was beautifully arranged, and the culture harmonised well with the variety in the public demands. Having been at Smithfield market early on Monday morning, he had observed that the butchers from the West End had the first choice of the market; then came the purveyors for the mass of the middle classes; and, last of all, came those whose business lay chiefly with the working-classes, and who said they must have a great lot of meat for their money (laughter). A very remarkable alteration had taken place of late years with regard to the conveyance of sheep to market, and the return to the seller. When he was a lad, living in Lincolnshire, his father's sheep and capital were a fortnight walking to the metropolis, and they each lost eight or ten pounds' weight of meat on the way. Of course no one got the meat that was expended on the route—it was so much absolute waste. Now, sheep were conveyed from Lincolnshire to London in a few hours, and within thirty hours after they left the farm the animals were not only sold, but the farmer or dealer had his money for them, and could thus employ it at once. This was a very great improvement; in fact, one of the great facilities afforded by the railways. It was not necessary that he should say anything with regard to the dead meat markets, as they were all familiar with them. Here, again, however, was a comparatively new state of things. Meat was now brought from Scotland and other distant parts of the kingdom, which did not come formerly; and rapidly as people from various districts had located themselves in the metropolis, the supply of meat had followed them in the same ratio. The use of artificial manures had a close and interesting connection with this subject. By using such articles the farmer was enabled greatly to increase his growth of turnips, and before it was necessary for him to pay for the manures, he had an ample return in the extra quantity of sheep which he was thus enabled to keep and send to market. He must now conclude. He had told the commissioners that it was quite impossible for him, within a single lecture, to exhaust the whole question of the culture of sheep. The wool production he had not yet touched, and he believed it was to be entered upon by a gentleman from the North of England familiar with manufactures, who would take up the subject where he (Mr. Smith) had left it. The wool collection in the museum was by no means complete; and as he had before intimated, he should, after his return home, do everything that might be in his power to supply the defects. The great importance of sheep, in relation to their wool-bearing properties, was daily increasing. Beyond our own growth the imports of wool from Australia, in 1807, amounted to only 245lbs.; whereas in 1855, the latest period up to which the returns extended, the importation was 40,810,137lbs. In 1833 we received from India 3,721lbs., in 1855 4,594,520lbs. The total imports of wool from all places, in 1855, amounted to 99,300,446lbs.

The lecture occupied one hour and three-quarters, the whole of which being given from notes, made it the more interesting to the audience. The lecturer concluded by thanking the audience for the patience with which they had listened to him, and on retiring he was loudly cheered.

ON PIGGERIES.

Swine are filthy animals in the cleanest condition in which they can be kept, and emit an offensive smell that is very disagreeable to other animals, as to cattle, with which the nearest association is placed in the arrangement of being reared and fattened. The manufactory of pigs is best located in a separate position from the farmery, but closely adjoining it, as the purposes are combined, and require a juxtaposition of utensils with which to work in unison. The site of the farmery, and the elevation of ground, will very much dispose the arrangements. The piggery may stand in the front range of either wing, in a small distance removed, and with an open front to the most benign aspect. The walls of the erection being low, the position in front of the farmery will not much exclude the sun from shining on the farm-yard behind, and a space of twenty or thirty yards being intervened between the piggery and the front of the farmery, no inconvenience will happen from the respective situations. As in all cases of the kind, circumstances will direct the arrangements.

The exterior shape of the piggery is best in a long square, differing in a third or fourth from the true equality of sides. The shortest sides are placed to form the back part and open front, the former being divided into a cooking-house, and sheds for the boar and brood sows; the extent being always proportioned to the size of the farm, and the number of swine that can be kept. An end door in the food-house affords a passage along the front of the breeding sties, and a ready access with food and litter. A front door in the centre of the house leads along a paved road between two rows of feeding sties, in which the bacon hogs are confined, in two together, and provided with sty and shelter-shed of the area of about 100 square feet. A light four-wheeled waggon of thin iron carries the food along the passage, and the swine are fed on the right and left with much convenience and facility. The two rows of sties, and a centre passage in width, occupy the length of the food-house on large farms; on less extents, one row of sties will be placed, and an end-door will serve the feeding and breeding departments. The front of the breeding sties in width, the short side of the piggery, minus the length of the cooking house, extends to the open front of the whole erection, and forms a yard for store pigs, from the age of being weaned, till drawn into the feeding sties, according to the forward condition. Shelter sheds are placed along the side-wall of the store-yard, and low in the roof, in order to preserve warmth, that is so essential to the welfare of swine. The young pigs are placed in this yard immediately on being weaned, are fed for a time with wheys and milks, mixed with meals, and gradually entered into the food of vetches and clovers during summer, and raw potatoes and turnips during the winter. Ample litter of straws and chaffs is supplied to this yard, and the best is the strawy litter from the stables, which being warm in the dung of the horse, supplies warmth to the pigs; and being mixed with their saponaceous excrement, a manure of great value is formed. The refuse of the green vetches and clovers adds to the mixture in the varied composition. In this yard is shown the great value of swine, as manufacturers of manure. The green food of summer, in clovers and vetches, induces a large discharge of urine, which impregnates and renders soluble the woody fibre of the refused stems, and the straws that are used as litter; the cold saponaceous excrement is mixed with the warm fæces of the horse; while the noses of the animals being constantly employed in searching for food among the litter, turn over and mix the whole mass of substances in a very beneficial manner for the purpose of a vegetable compost. The yard must be frequently covered with litter, and thinly and evenly spread: the different substances must be mixed in the layers, in order to produce a similarity of composition and condition in the mass when it is carried to the manure heap in the fields, and placed in the layers of alternate qualities. This attention is necessary to every preparation of manure in the farm-yards—a level surface, frequent coverings with litter, thinly and evenly spread, and a thorough impregnation of every part with the urinary moisture of the animals. If any part is seen to be too dry, it must be laid level, and covered with moist substances; if too wet, the dry litter of the stable must be strewed over the place, and each part of every yard must be thoroughly treated with moisture in the proper quantity. A regular attention will prevent any deviations from this essential rule.

The season of curing bacon extends from October to the end of March, and during that time there may be preserved two fattenings of hogs in succession. The pigs in the store-yard, that are of the proper age and most forward in condition, are placed in the feeding-sties, in two together, by the first of October, and will be ready in the beginning of January: a second lot is drawn into the sties from the store-yard, and will be ready in March, which concludes the season of curing. The management after that time is wholly in the breeding-sties and store-yards. Brood sows are best restricted to two litters of pigs in a year, and an average of eight in a brood will afford a full supply of animals to be manufactured. More litters may be got in a year, but the vigour of the pigs becomes puny, and the sow is much exhausted by the severe employment of suckling. A less frequent propagation produces a more vigorous progeny; and not only in swine, but in every animal whatever; and if the system were adopted pursued, the result might wholly reproduce the animal organization.

It has been very satisfactorily ascertained that swine are benefited by cooked food in a very large degree; while other animals, as horses and cattle, show a promotion that does not compensate the labour of preparation. The physical constitution of the pig, and its delicate intestines, may account for this differential benefit. Bacon pigs are fed twice a-day, by break of morning, and in the early evening before sunset, with cooked food, in steamed potatoes mixed with meals of any kind, moderately thickened, and given in a milk-warm condition. This preparation is done in the food-house before-mentioned, which contains the steaming apparatus and the meals in readiness. It is two storeys high, and the second floor is dry for the meals, which are kept there for use. The daily allowance to the pigs is ample to the full satisfaction, but none to remain in the troughs to become cold, and produce a nauseating effect. The quantity the animals can daily consume is soon ascertained, and regulated accordingly. During the last month of fattening, one daily meal is given of uncrushed grains, as oats and barley, and especially of beans, which contain the tannin principle, and impart a muscular firmness to the flesh, and the whiteness that so much recommends the quality of the bacon. This firmness is a chief point by which the flesh is judged.

Brood sows are constantly fed with liquid substances, as milks and wheys mixed with meals, which promote the secretion of milk for the hard task of suckling. Dry food for a time, after the pigs are withdrawn, much encourages the salacity. Weaned pigs are treated for a time with warm gruels of meals and milk—thin and warm at first, then gradually thickened and used lukewarm into a cold condition, when the animal becomes a gradual consumer of clovers and vetches, and raw food.

It is very advantageous that a few small pigs from weaning have the liberty of wandering over the feeding-yards at pleasure, and to sleep and nestle in some chosen corner. A hole in the lower part of the gates lets the animals in and out the yards, in which they eat the crumbles of the turnips, and search for pickles of grain among the straws of litter. The surface of the yards is turned and tossed about by search with the noses, and a beneficial mixture is effected of the different substances. Pigs, in a limited number, are brought forward in this way in a very fresh condition for the feeding sties, and when assisted with light grains laid on dry ground, the full fattening is done as well as in fattening cribs. The meat may not be so large in quantity, but the quality is superior both in texture and firmness.

The mode of rearing and feeding swine now detailed may be done on any farm according to the extent, from one brood-sow to four, which will afford fifteen to sixty pigs yearly. The intervening numbers will fill the different extents of occupation. Every method must be systematic—large or small, the performance must be regular and orderly, with a constant adhesion to the rules that are adopted. The buildings must be provided, and the food allotted; the care must be bestowed, and the attention unceasing. From want of systematic regulations, there constantly happens desultory and languid performances, which fail to produce any valuable results, and sink into weak and unprofitable establishments. Swine yield more flesh from the food consumed than any other fattened beast: the quality is very nutritious: it takes the salt more readily than any other flesh, and, from the smaller quantity required on that account, the cured article is not so salt in the use as other flesh from animals. It enters very largely into the consumption of naval stores, and for domestic use the flesh is very extensively entertained both in a fresh and cured condition. No other animal food enters so largely into general consumption; yet in some few cases only has the manufactory of the flesh been reduced into system, as with sheep and cattle—food is grudged, and attention withheld, and the animals wander about the farmery despised and unvalued. No farm is established without an arrangement for swine, than which no animal will yield so much flesh for the food consumed, or is fattened with so little cost. J .D.

THE USES OF A DEAD HORSE.

The first, or introductory lecture on the Commercial Products of the Animal kingdom, in course of delivery at the South Kensington Museum, was delivered by Professor R. Owen, who gave a *resumé* of the economic uses of animals generally to man, interspersed with much interesting information on anatomy and physiology, in that pleasant and popular style for which he is characteristic.

The second lecture was delivered on the 25th Feb., by Dr. Lyon Playfair, C.B., on the use of refuse animal matter; and it is this address to which we would chiefly call attention, as affording much curious detail. Taking as his text, the uses and value of a dead horse, the lecturer went over the whole range of seemingly waste products, detailing their processes of re-conversion, comparative value, and resulting products; thus proving that if we but follow the example of Nature, all substances, however apparently noxious and useless, are re-convertible into other and very important commercial products.

We shall confine ourselves, in the present instance however, to his main illustration—the carcase of a dead horse.

What the mortality may be of the equine race in the United Kingdom we have no means of ascertaining. Indeed, we have no correct data for estimating very precisely even the total number of horses in the United Kingdom. We have returns for Ireland and Scotland, and the agricultural statistics for these countries for 1856, gives the number at 753,170. Those in England and Wales must be guessed at. Sixteen or seventeen years ago Mr. M'Culloch estimated the number of horses in Great Britain at 1,400,000 to 1,500,000. Now this guess must have been somewhat wide of the mark, for there are scarcely more than this in the whole kingdom at the present time, at least judging from the most careful calculations.

Three or four years ago Mr. Braithwaite Poole, in his "Statistics of British Commerce," took some pains to arrive at the true figures; and his estimate, based upon parliamentary returns and carefully-conducted enquiries, brought out the numbers at about one million and a-half, classified as follows:—

Paying duty (of which 1,530 were race-horses)	320,982
Exempt from duty	413,028
Partly exempt from duty	77,827
Horses in Ireland	488,908
Young horses, ponies, &c., &c.—Scotland and Wales	200,000
	1,500,745

Now this is much below the number at the present time; for in 1847 the number of adult horses in the United Kingdom was given at 805,458, of brood-mares 4,246, and of horses used in husbandry 900,000; and a parliamentary return of 1854 showed that there were 432,746 horses paying duty. We have also, of late years been importing largely from the continent—especially from France and Belgium. For the four years, ending with 1856, we received 18,293 horses from the Continent.

With the large traffic carried on in the metropolis by omnibuses, cabs, pleasure horses, brewers, carriers, travellers, and other draught animals, the numbers in London must be very considerable. There are at least 7,000 public conveyances plying for hire, and the omnibuses alone employ about 13,000 horses. The number of vehicles passing along the principal thoroughfares in an ordinary day of twelve hours, is about 126,000.

Having dealt with the statistics of living animals, let us now look to the commercial products of the dead horse. From 250 to 300 horses die weekly within a radius of five miles from Charing Cross, and the flesh of these is chiefly consumed by dogs and cats within that area.

Firstly, then, we have the hair, which may weigh about 1½lb., and which sells for 8d. to 1s. Horse-hair we know is applied to many purposes; it is made into hair-cloth for seatings, coloured hair damasks, bags for crushing seed for the use of the oil-crusher, cider-makers, and others. A consumption of 800 tons of horse-hair a-year, of home and foreign production, valued at about £80,000, shows the value of this one item.

Next we have the hide, weighing—say 30lbs., and worth possibly 8s., for converting, when split, into the finest Cordova leather; or, in its full thickness, for covering the large board-room tables of offices, &c.

The tendons weigh probably 6lbs., and are converted, like other animal tissues, into fine glue, or gelatine.

The flesh will weigh about 224lbs. boiled, and may be used as meat for men, dogs, poultry, &c.

Smile not, gentle reader, at the banquet offered—of viands which are just now in high repute on the continent. A society of economists, naturalists, and hardy gourmands in Paris, aim at the introduction of horse-flesh in the category of butcher's meat. They set the example themselves, and this example is spreading. It is argued that the horse ought to contribute to the nourishment of the human race, as well as the ox, the sheep, and the pig. That it does so already in our own metropolis to a great extent, in the shape of nominal smoked "ox-tongues" from Russia, and chopped so-called "beef" sausage-meat in Westminster, Whitechapel, and other suburban localities. But the penchant for roast and boiled horse-flesh has found adherents even here, and our esteemed contemporary, the "Journal of Agriculture," of Edinburgh, has come out strong in a recent number in its favour.

M. St. Hilaire, the champion of this new addition to our food resources, reasons in this fashion—

"Horseflesh has long been regarded as of a sweetish disagreeable taste, very tough, and not to be eaten without difficulty. So many different facts are opposed to this prejudice, that it is impossible not to recognize its slight foundation. The free or wild horse is hunted as game in all parts of the world where it exists—Asia, Africa, and America—and formerly, and perhaps even now, in Europe. The domestic horse itself is made use of as alimentary as well as auxiliary—in some cases altogether alimentary—in Africa, America, Asia, and in some parts of Europe.

"Its flesh is relished by people the most different in their manner of life, and of races the most diverse—negro, Mongol, Malay, American, Caucasian. It was much esteemed up to the eighth century among the ancestors of some of the greatest nations of western Europe, who had it in general use, and gave it up with regret. Soldiers to whom it has been served out, and people in towns who have bought it in markets, have frequently taken it for beef. Still more often, and indeed habitually, it has been sold in restaurants, even in the best, as venison, and without the customers ever suspecting the fraud or complaining of it.

"And, further, if horseflesh has been often accepted as good under a false name, it has also been pronounced good by those who, to judge of its qualities, have submitted it to careful experiment, and by all who have tasted it in proper condition—that is, when taken from a sound and rested horse, and kept sufficiently long. It is then excellent roasted; and if it be not so acceptable as *bouilli*, it is precisely because it furnishes one of the best soups—*perhaps the best* that is known. It is good also, as experiments prove, made by myself as well as others, when taken from old horses, not fattened, whose age was sixteen, nineteen, twenty, and even twenty-three years—animals thought worth no more than a few francs beyond the value of their skin. This is a capital fact, since it shows the possibility of utilising a second time, for their flesh, horses which have already been utilised up to old age for their strength; and, consequently, of obtaining a further and almost gratuitous profit at the end of their life, after they had well-nigh paid the cost of their rearing and keep by their labour."

So much for the great champion of horseflesh.

Having disposed of the flesh, we come next to the blood, heart, and tongue, weighing about 60lbs. The former is used, like the blood of other animals, as a decolorizer, for manure, and for making, with other animal substances, the well-known salt, prussiate of potash. The disposal of the heart and tongue we will say nothing about, as there is somewhat of mystery resting upon their appropriation.

The intestines of the horse, weighing about 80lbs., are converted to several uses. When cleaned, they serve for covering polonies and sausages; or they are twisted into bands or strings for bowing cotton, or for other purposes.

There is seldom much fat to be got from the horse: probably about 20lbs. may be obtained; and this is used, after being distilled, for burning in lamps. We import horse grease largely from the River Plate, but we get better at home. The grease is also worked up by the soap and candle makers in common with other fats, while the entrails and remnants are given to hogs, to make food for home consumption—at least this is so in the United States, where the porcine race are less daintily fed than our own store-fed pigs.

The bones come next; and these weigh, say about 160lbs., and are sold at the rate of 4s. 6d. per cwt., either to convert into knife-handles, or for making phosphorus, and superphosphate of lime. They will not do for animal charcoal, because horses being usually killed when aged, the bones contain too great a proportion of phosphate of lime, and too little animal matter. Ground into dust, or crushed into half-inch bone, they make excellent manure; while other special manures for turnips, &c., are made from the blood, flesh, and bones combined.

The Kensington Museum catalogue, compiled by Mr. P. L. Simmonds, lets us into the secret of a ready way of cleaning the bones and divesting them of putrid flesh, &c., so as to fit them for use in manufactures. To take off the flesh by hand is a tedious and difficult operation. An ingenious Frenchman solved the difficulty. He noticed that rats were very fond of horse-flesh; so are fowls—other arguments in favour of M. St. Hilaire's reasoning of the wholesomeness of the food. Our Frenchman advised the authorities to colonize the dead horse-pound with rats. This common pound is an enclosed area of about ten acres, surrounded by a stone wall, to which all carcases, &c. are taken, and among the rest the 400 horses which die or are killed in a week in Paris. The catacombs furnished rats by thousands; and now a dead horse put in over night is picked beautifully clean by the morning, and the bones are ready for the bone-dealer. A grand battue is also periodically made, to keep under the rats, and they are utilized by making their skins into gloves, and possibly their flesh into pies or ragouts. We have nearly done with the economic uses of our worn-out hack; there remain but his pedal extremities to deal with. The hoofs, weighing about 6 lbs., are worth 8s. to 10s. per cwt. for gelatine, or for making prussiates. They are not adapted to pressing into the, so-called horn buttons, which are made from ox-hoofs, but possibly may turn up polished in the shape of a snuff-box, capped with silver. The shoes will work up into shoes again, or sell for old iron; and the nails are much esteemed for making gun barrels.

We have now used up our "old horse," and this is merely the example of many other animals whose carcases are turned or might be turned to various useful purposes. Such a history points a moral that nothing should be despised, for out of many waste substances money is to be made; and the large profits of scavengers, knackers, and dust-contractors are evidences of the utilization of offal and sweepings.

FURZE AS FOOD FOR HORSES.

SIR,—As you now and then receive some little matters written by me, and are so courteous as to give them a place in the *Farmers' Gazette*, I now send another, in the hope it may promote your object in being of benefit to those who read your paper. It has been too much the practice of horticulturists to introduce and recommend new plants and flowers, and to let the old pass into oblivion. Thus the beautiful moss-rose, the cabbage-rose, the York and Lancaster, the double white-rocket, with others, which fifty years since were the delight of the cultivators, some are now never seen, and others, like poor relations, are left to take the lowest room, and new or scarce plants and flowers, which bear no comparison in fragrance or beauty, are the ornaments of the garden. In the same way, in improved agriculture—though there are few who join more in heart and hand in the introduction of new plants and new practices to this land—though there are many of the old I long to see exploded, such as poorly-paid, badly-fed, and, as a certain consequence, badly executed labour, small, weak, badly-fed horses, and consequently light and inefficient ploughing, and therefore scanty produce—still there are others of the old school I regret to see neglected—

> "'Tis right to be off with the old love,
> Before we are on with the new."

I shall now make some remarks on the most valuable of those old practices which are too much neglected—feeding cows and horses on furze (whins), the fiorin grass, and irrigation. I have been for fifty years and more feeding my cows and horses on furze; and I can say, from that long experience, that it is the cheapest and the best food for the autumn and winter months. I saw it in constant use at the residence of the late Rev. Horatio Townsend, the author of the statistical survey of this county, who strongly recommended it. I followed his example, and never have regretted doing so. I have had my horses, getting neither hay or oats, in more beautiful condition (sleek as mice) than any of my neighbours, though they had costly grooms, the horses fed with best hay, oats, and beans, and warmly clad. Mine were, perhaps, not as fit for the race-course or the hunting-fields; but for road-riding, carriage-work, or the work of the land, they were most fit, although fed only on chopped furze and steamed swede turnips; and I rejoice to see that this valuable food has been brought under the notice of the agriculturists.

On arranging some papers lately, I found a letter, dated June, 1840, from one of the best practical agriculturists I know. He states, "The most profitable crop I have planted is furze. With an acre and-a-half I fed five horses up to the first of June. I have twelve tons of hay for sale, which I never had before. It would be much easier to induce the farmer to cultivate furze than to grow turnip; and I believe it is more profitable. Land inaccessible to the plough, of which we see so great a proportion, would yield great crops of furze; and land remote from manure could not be better disposed of. We are in the infancy of knowledge as to what ground is capable of, or what plants are best suited to the varieties of soils. The florin is a plant that never got a fair trial in the south of Ireland. I think the time will come when all the bog and low lands will be covered with it. If you look out about the latter end of June you will meet it at every step." The old practice of preparing furze was tedious, and comparatively expensive—by a block with transverse knives, sometimes with a long handle, and better with a chain, hooked on what is known by the name of a turner wattle, or by a straight spade, sometimes by thrashing. The great desideratum has been hit upon by Messrs. Richmond and Chandler, in their powerful straw-cutters, varying in price from £7 to £10.

I have just now attended my machine bought from Mr. Thomas M'Kenzie, Cork, for £7, a man cutting, and a boy feeding it, the furze ready, and in 17 minutes they cut 17 buckets full. The bushel contains 3½ gallons. This is fully sufficient for four horses for 24 hours instead of hay; hay is spread on the top of the furze, and cut with it; it improves the cutting, saves the boy's hands from the prickles, and is an advantage in the feeding. When ready it is wetted with water, which makes the mastication easier. The expense of the man and boy is 1s. 5d. a day—say 10 working hours, and working little once a quarter-hour or the one-fortieth of 17 pence for the labour of preparing food for four horses, or about three-eighths of a penny a-head. A tenant of mine who lives in Carberry told me he feeds his horses entirely, and his cows mostly, on it all autumn and winter; he mows it every second year, and has abundance for them from a piece of land which cannot be ploughed, and which would produce nothing else; he cuts it with the straight spade, and it takes a man for the entire day to prepare sufficient for six horses. Now that Richmond and Chandler have brought out such a machine, there is no excuse for it not being in general use; and though furze will grow well on stony and rocky land (I have seen the roots several feet down in the chinks of a quarry), the best arable dry land will produce a far better and more abundant crop, and a more succulent shoot. Three acres of such land appropriated to the growing of a plant which is perennial, and requires no further culture (though, I doubt not, it would be still better for annually opening the ground and digging or forking in manure), still an everlasting winter meadow, of no comparison better food than hay, is no slight benefit now that the difficulty of its preparation—the great obstacle—has been overcome. Cattle will not hove with it. They are always sleek, an indication of health. It is in a fit state from October to May, inclusive. It improves the wind; a thick-winded horse becomes a free breather; broken-winded have no appearance of their being so; and I have seen horses cured of cough by feeding with it. I dare say many who know not its value, and who are of those who deprecate any innovation or change, will say all this is hyperbole; this was often said of florin and of turnip culture; but when the failure of the potato compelled turnip culture, they then saw that the new was better; and I pledge myself that any who henceforth use furze, as directed, will fully agree in every word I say. Directions for sowing the seed in fields would be very desirable.

Yours, &c., WILLIAM R. TOWNSEND,
Aghadda Rectory, Rostellan,
Co. Cork, Feb. 12, 1858.

ON THE ACTION OF NODULES OF PHOSPHATE OF LIME ON VEGETATION IN GRANITIC AND SCHISTOSE SOILS.

[TRANSLATED FROM THE FRENCH OF THE "JOURNAL D'AGRICULTURE PRATIQUE."]

In according its kind approbation to my last researches on the solubility of fossil phosphates of lime, and in deigning to encourage me, through the organ of its reporter, M. Payen, to follow them up, the Academy of Sciences has marked out for me a course in which I have proceeded with the anxious desire of noticing in it some facts interesting both to physiology and to agriculture. I propose to detail the first results to which my experiments have conducted me.

I was desirous, in the first instance, in spite of the unfavourable season, to make in May some preliminary essays on the culture of wheat. For that purpose I commenced operations upon a piece of land cleared only a few days previous to the experiment, and on which I have comparatively employed nodules of pulverized phosphates at the rate of 55 per cent., and animal charcoal (black) in small grains, 72 per cent. of richness. The earth, rich in humus and acid principles, possessed the best conditions for dissolving the phosphates. The dressing was employed at the rate of 6 hectolitres to the hectare, and the results observed were as follow:—

In the pieces which were planted with wheat there was no appreciable difference between the produce of the animal charcoal, the fossil phosphates slightly animalised, and the same phosphate mixed with very porous charcoal. There was a very marked superiority, which I was far from expecting, in another piece in which the nodules, simply reduced to very fine powder, had been employed comparatively with animal charcoal in small grains. In all these essays in other respects the produce was moderate, whatever was the dressing adopted, in consequence of the very recent clearing of the land.

Two pieces of land were sown with oats, and dressed, one with powdered nodule, the other with animal charcoal. In both cases the produce was fine, but there was still no appreciable difference observable, either in quantity or in the appearance of the crops.

In spite of the unfavourable conditions in which these preliminary essays took place, I must confess I was struck with surprise on seeing my anticipations at fault in regard to the action of the fossil phosphates *employed alone, and in the state of fine powder.* My researches in the laboratory on some coefficients of solubility in carbonic acids, the laws of analogy, and, I must also add, the ignorance of actual science as to the modifications the nodules undergo in presence of the air contained in the arable soil—all this led me to regard these manures as slowly assimilable, deserving on this account to be classed far enough from bone charcoal. Nevertheless the agricultural experiments seemed to contradict my preconceived ideas. We shall see, as we proceed, that this contradiction manifested itself afresh in more conclusive essays.

My second series of experiments were made on the culture of buckwheat, which in the west absorbs enormous masses of animal charcoal. The surplus of the quantities assimilated by this plant remain in the soil, in which its action is subsequently felt upon the winter wheats.

In order to place myself as much as possible beyond the influences, multiplied and unequal, of experiments on a large scale, I resolved to make my experiments in pots, on substances exactly weighed, and in presence of elements of irrigation and exposure perfectly identical.

Eleven pots were filled with earth extremely poor, and derived from the disintegration of schistose rocks. The earth was minutely mixed in each pot with 10 grammes of manure and two seeds of buckwheat, which were sown from the 25th of June to the 22nd of September, when the experiment was completed. The watering of the pots was performed twice a-day with rain water. Vegetation proceeded well, except in the cases in which earth was used without manure, and with nodules treated with 20 per cent. of sulphuric acid. In these two instances the plants were poor and weak, and the produce insignificant. We must not forget that the poverty of the earth employed was extreme. Humus existed in it only in very minute proportion. Its aptitude to retain water and condense the gases was as feeble as possible.

At the end of three weeks, it was easy to perceive the favourable effect of the phosphoric acid upon the buckwheat. Where the superphosphate of lime, of animalised phosphates, and of the mixture of blood and powdered nodules were used, the vegetation was both luxuriant and precocious. The animal charcoal was distanced, and owing to the poverty of the earth the pure phosphate of lime gave wretched results. The following, however, is the complete summary of the observations, made with the greatest care:—

RESULTS OF THE CULTURE OF BUCKWHEAT IN A SCHISTOSE EARTH, DESTITUTE OF HUMUS, AND IN PRESENCE OF A QUANTITY OF PHOSPHORIC ACID EXCEEDING THE REQUIREMENTS OF THE CROPS.

THE KIND OF MANURE USED.	DRY GRAIN HARVESTED.	DRY STRAW HARVESTED.	TOTAL RESULT.	HEIGHT OF THE PLANT.	NUMBER OF GRAINS.	OBSERVATIONS.
	Grammes.	Grammes.	Grammes.	M.		
Fossil phosphate in large grains, containing 54 per cent. of phosphate of lime	0.368	1.280	1.648	0.30	18	—
Phosphate in fine powder	0.462	1.458	1.920	0.56	34	—
Phosphate mixed with vegetable charcoal and very weakly animalized	1.282	1.810	3.090	0.50	111	—
Phosphate mixed with dried blood and containing 5 per cent. of azote	1.693	2.190	3.883	0.44	137	—
Phosphate treated with 20 per cent. of sulphuric acid neutralised with chalk	0.020	0.870	0.890	0.27	2	abortive
Phosphate treated with hydrochloric acid	0.547	0.790	1.337	0.30	33	—
Pure regenerated phosphates of the nodules	0.630	0.700	1.330	0.30	40	—
Charcoal from the sugar refiners, 67 per cent. of phosphate, and 1 per cent. of azote	0 970	0.893	1.863	0.28	64	—
Charcoal from the gelatine factories, 83 per cent. of phosphate, and 5 per cent. of carbon	0.212	0.375	0.587	0.29	18	shrivelled
Guano from the Caribbees, 74 per cent. of phosphate, and four-thousandths of azote	0.703	0.843	1.548	0.35	45	—
Poor earth without manure	0.040	0.724	0.764	0.27	4	abortive

In examining these figures it is important to state that they clear up a particular point of the question, without constituting on that account a scale of return applicable to the condition of an extensive cultivation. Indeed it is very evident that the impulsive action produced by the azote was not applied here to the phosphate of the animal charcoal as to that of the nodules mixed with blood. I would, however, remark that the experiment No. 3, the results of which are very fine, were produced under the influence of weak doses of animal substances. Had the porous vegetable charcoal in this case a condensing action immediately utilized? It appears very probable.

Let it therefore be well understood that the figures expressed in this table are applicable only to the special circumstances of the experiment, and it is requisite, in order to study more completely the action of the nodules, to make new essays in which the organic matter of the soil determined will perform a part which is wanting here. Under these reserves I think I am able to establish the following facts:—

1. The nodules of phosphate of lime of the Ardennes, reduced to fine powder, and exposed some months to the air, are assimilable by vegetables.

2. Their favourable action on granitic and schistose soils, in the clearings of lands and heaths, may be variable according as we employ them alone or associated with organic substances.

3. As this is also remarked in the employment of the phosphates of charcoal of clarification, and charcoal powder of the filters, there is agreement sometimes in associating organic substances with the nodules in fertilising poor soils by dissolvent agents, and sometimes, on the contrary, in employing them alone on clearings in which vegetable substances abound.

4. The addition of blood to the powdered nodules gave excellent results in the triple point of view, of return in grain, of vigour of the straw, and of precocity.

5. The employment of the action of acids, in order to promote the assimilation of phosphates, will only take place in *lands and cultures in which the superphosphate is actually found useful by the agriculturists*. In all cases, on the contrary, in which bone-black in grains is rapidly dissolved, the nodules finely powdered will themselves be assimilated.*

6. Lastly, and as a consequence useful to point out, it is once more established that from the search for co-efficients of solubility in the laboratory, to the agricultural verification, there is all the distance that separates an extremely simple effect from one extremely complex.

ADOLPHE BOBIERRE.

BATH AND WEST OF ENGLAND SOCIETY.

A Monthly Council was held on Saturday, Feb. 27, at Waghorn's Hotel, Taunton, John Sillifant, Esq., in the chair.

THE CARDIFF MEETING.—Mr. Widdicombe (Director), brought up a report on the subject of the tenders received from the various contractors for the erection of the hoarding, for the show-yard, offices, and works for the meeting at Cardiff in June next. The tender of Mr. George Pollard, builder, of Taunton, was accepted. The report of the committee (under the guidance of Mr. Gooch, the consulting engineer of the society), on the terms upon which steam-engines would be permitted to exhibit in the show-yard, was introduced and discussed. The report was adopted, and ordered to be printed and circulated among intending exhibitors in this department.

THE MEETING IN 1859.—The deputation appointed to visit Barnstaple reported that they went to that town on Thursday last, and inspected three sites offered for the exhibition next year. They now recommended a piece of land about a mile from the Barnstaple Station, on the North Devon Railway, in every way suitable, provided the requirements of the society were complied with. It was also reported that eligible fields for the trial of implements would be offered to the council on advantageous terms.

NEW MEMBERS.—The following new members were elected:—

Mr. R. F. Jenner, Winvoe Castle, Cardiff
Mr. Blackburrow, Tower Head, Banwell
Mr. N. Cook, Ayshford Court, Somerset
Mr. F. T. Allen, West Kington, near Chippenham
Mr. J. Spurway, Spring Grove, Milverton
Mr. J. P. Spurway, Spring Grove, Milverton
Capt. F. Spurway, 2nd Somerset Militia.

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* This is, on the whole, what practice has already demonstrated in the last harvest with the greatest clearness.

MR. POPPY OF WITNESHAM.

RESPECTED FRIEND,—Herewith I send thee an extract from the *Suffolk Chronicle*, giving a brief outline of the life and labours of our valued old friend and father of farmers' clubs, Charles Poppy—thinking it probable it would be interesting to the readers of the *Mark Lane Express*, some few of whom, who were readers of the agricultural periodicals sixty years since, will probably recollect his early efforts to promote the practical interests of agriculture. To him we owe in this district the earliest introduction of swede turnips, as of a crop of mangel wurzel, and of Belgian white carrots; the most successful prevention of the ravages of the turnip fly; the invention of the scarifier, which was the original type of those now in use; and the introduction of the system of farmers' clubs. Well do I recollect visiting, in company with my highly-esteemed friend, John Morton, one of the monthly meetings of the primitive club, held in the long low-room of the village inn at Ashbocking, when, seated as president at the end of a long table, covered with gigantic roots, interspersed with glasses of steaming mixture, and pipes with well-waxed ends, he gave us, in his own genial and unobtrusive manner, interesting anecdotes of his successes and his failures, of his temporary discouragements and his ultimate rejoicing in the triumph of successful attainment. At a shortly subsequent period, two or three of those warmly interested in agriculture in the neighbourhood of Yoxford visited the Ashbocking Club, and the rapid establishment of similar clubs in Yoxford, Halesworth, Beccles, Wrentham, Harleston, Framlingham, and Wickham Market, was the result. Through the kindness of the editors of the *Mark Lane Express* the reports of the proceedings of these various little societies were published, and the practical usefulness of their discussions thus obtaining wide circulation, institutions of a similar character were speedily formed throughout the length and breadth of the land.

About this time, the late William Shaw with two or three of his friends, conceived the idea of centralising these by the establishment of a club in London, and hence the commencement of the Central Farmers' Club.

Surely amongst the thousands who have through so long a period benefited by the disinterested labours and researches in which he has spent his long and useful life, there must be many who will rejoice in the opportunity to contribute to the promotion of his comforts and that of his aged partner for the few remaining years that may yet be allotted to him, now that the day of his working for others —at the age of 85—is well nigh passed.

His old friend and co-worker for nearly 50 years, Arthur Biddell, of Playford, has organized the plan of obtaining sufficient funds for the purchase of an annuity on the joint lives of the worthy pair; and if thou couldst suggest that subscriptions should be received at the office of the Central Farmers' Club, there is little doubt the object would be speedily accomplished.

With kind regards and pleasant memories of other days,
I remain, my dear friend, sincerely thine,

Ipswich, 2nd Month 22. J. ALLEN RANSOME.

SUFFOLK WORTHIES AND PERSONS OF NOTE IN EAST ANGLIA.

CHARLES POPPY, THE AGRICULTURIST.

Among the many men in Suffolk who have achieved a name and reputation by the practice of agriculture, few could be mentioned who have so deservedly won a claim for distinction among Suffolk farmers as Charles Poppy, of Witnesham. This venerable agriculturist, the correspondent and contemporary of Arthur Young, Sir John Sinclair, George Webb Hall, and others—a man whose numerous experiments and lengthened experience on the crops and soils of this district render him pre-eminent among the occupiers of land in Suffolk—is justly entitled to a niche in the temple of agricultural fame.

Charles Poppy was born in the parish of Withersfield, in the year 1773. At eight years of age he was sent to be educated at Tilney School, Harleston, Norfolk, where he remained seven years. Thomas Pallant, the meteorologist, was a schoolfellow of his. When he left school he was placed with Mr. Candler, of Linstead, near Halesworth, for instruction in farming. There he profited but little, for his master was not a strict one, and, as many of Charles's schoolfellows lived in the neighbourhood, he had the run of many farms; and this suited a mettled lad of his age better than work. It was a dairy farm, and he remained there two or three years. Candler was a regular old-fashioned farmer, but hearing that a new-fangled system of draining had been tried on a farm at Cookley, he took his agricultural pupil with him to look at it out of curiosity, and here it was that our future experimentalist saw, for the first time, an arable field of six or eight acres subjected to the system of *thorough* drainage.

From Mr. Candler's he went to "Frendze Hall Farm," Scole, Norfolk, an arable and grazing farm of upwards of four hundred acres. There he remained four years, and there he learnt to work. There it was that he made the acquaintance of Mr. Kent, who was steward to George the Third, which led to an interchange of correspondence upon agricultural subjects. There it was that he first saw Swede turnips grown. Thomas Avis, Esq., steward to the Duke of Norfolk, occupied the farm adjoining "Frendze Hall," and he was at that time trying to grow swedes, the root being then unknown in the East Anglian district. Mr. Avis raised them in his garden and then planted them out, and he continued this practice for several years.

As the fourth year drew to a close our young farmer began to feel himself able to practise the art of agriculture, and he therefore engaged himself as assistant to Mr. Wythe, a land valuer and agent at Eye, who occupied the "Park Farm," and two others in the immediate neighbourhood. Having procured some seed from his old neighbour in Norfolk, Mr. Avis, he proceeded to try the experiment of growing swedes. There was a bailiff at the farm, but such scarce and valuable seed he could not trust in other hands than his own, and he therefore sowed it himself. This was the first known instance of Swede turnips being sown for a crop in Suffolk. The seed, however, was put in too late, and the crop proved very poor, too small to feed cattle, lest they should choke themselves; in fact, they were like Bloomfield's description of the rinds of Suffolk cheese:

> "Too big to swallow, and too hard to bite."

After remaining four years with Mr. Wythe, he resolved upon farming on his own account. He took a farm at Occold; but at the end of three years the owner wanted it, and Mr. Poppy had to quit. He then entered into the seed business, and travelled over Suffolk, Norfolk, and part of Cambridgeshire. Being a keen observer, his travelling gave him a good opportunity of making himself acquainted with the soil, culture, and vegetable productions of the districts he visited, and this he did not lose sight of. The line of life, however, did not please him, and before the end of twelvemonths he was again engaged by Mr. Wythe to undertake the sole management of his farms, that gentleman having removed to West Norfolk.

Mr. Poppy, desirous of being on his own footing, next took a farm at Wetherden. Here a new phase of life opened to him. He married Frances, the youngest daughter of the Rev. John Gibbs, rector of Occold, and vicar of Yaxley, by whom he has had five children; three of them are now living in the United States, one, a daughter, is living at West Ham, and one is deceased. When he began married life he thought he was comfortably settled: prices were good; his farm of 160 acres was, to all appearance, one of average quality; his house was substantial, and moated round in the old style; and he had a partner to share his joys and his sorrows. But barberry bushes were dotted here and there in the hedges all over the farm, and to this he attributed the fact of his corn having suffered greatly from mildew. At the end of four years he had to quit, in consequence of the sale of the farm, and Thomas French, Esq., of Cranley Hall, Eye, gave him the offer of a farm at Witnesham, of 180 acres, at £40 a year less rent than what he was then paying, and, in addition, an offer of a lease for 21 years. This offer he embraced; he took stock and crops at valuation, and in 1807 took possession of the land, which he continued to cultivate for nearly forty-five years. When he came to the farm, although 160 acres of arable land, there were but two acres of white turnips grown: they were very small, and this was about the average proportion grown by the farmers in the parish. The mode of cultivating swedes was then unknown in this neighbourhood. Mr. Poppy found the white turnips almost useless on his heavy-land farm; the roads were so bad that carting them home was difficult, so that in sharp winters they sometimes rotted in the field, and in mild ones ran away so early that there was no feed left for the spring. This led him to turn his attention again to the cultivation of swedes, for which, and his experiments with the turnip fly, he afterwards became celebrated. The importance of these experiments may be judged of from the fact that one of the best agricultural authorities, Mr. Macro, has estimated the loss by the fly to amount to one year's crop out of five or six.

When, in 1827, the gold medal was presented to Mr Poppy by the Duke of Sussex, in the Haymarket Theatre, for his endeavours to prevent the ravages of the turnip fly, Sir John Sinclair introduced himself to the Suffolk farmer, and did all he could to make known the nature of Mr. Poppy's experiments.

Unfortunately for him, the promised twenty-one years' lease of the Witnesham farm was never executed. Mr. Poppy kept on farming and improving, prices were increasing almost every year, and in a few years he paid a heavy penalty for neglecting the affair of the lease. The owner of the farm and a friend visited him, and the next rent day the alternative was to Mr. Poppy either to pay an advanced rent or to quit. It was in vain that he pleaded his agreement: there was no written contract. He had himself become a family man, had expended a considerable sum in improvements, and it was not likely that another farm could then be obtained, and he had therefore to submit to the demand. His case is one among many of the folly of making improvements without security.

About this period he entered into a correspondence with Arthur Young about the "scarifier," and he sent a model of the instrument he had invented to the Board of Agriculture, at the time Sir John Sinclair was President; both Arthur Young and Sir John highly approved of the model implement, and felt sure of its getting ultimately into general use. Young, however, advised Mr. Poppy not to take out a patent, and the result is, that at the present day, scarifiers, of which his was the original type, may be seen on almost every farm in this district.

White carrots were introduced into this district by Mr. Poppy. He brought the seeds from France in 1828. Sauntering about Calais prior to embarkation, he saw some strange roots lying on the stalls of the market-place, that "looked like a hybrid between a parsnip and a carrot," and he at once bought some seed to try their growth in East Anglia. He was incessant in his labours to introduce mangold wurzel, but he for a long time met with great difficulties in persuading farmers to grow this valuable root, and he distributed seed, published pamphlets, and wrote letters to the public journals, with the hope of getting the root into general use; and there cannot be a doubt but that his exertions were of great value. Mr. Collett, of Clopton, had succeeded in growing the root, but his want of knowledge in storing them caused his crop to spoil. A labourer from that parish brought one to Mr. Poppy as a curiosity, saying, he "din't know what that was; if 'twas a carrot 'twas a stamming great un." Mr. Poppy has also been zealous in promoting the cultivation of "millett" as a useful stall-feeding plant for storing, and as a substitute for clover.

Mr. Poppy, in connection with a few friends in his neighbourhood, established the first organised Farmers' Club (the Ashbocking) for the exchange and record of the results of their practice. Of this club he was appropriately chosen chairman, and he was especially the guiding spirit of the club. His great natural abilities, extensive experience, and generous disposition eminently fitted him for the duties he undertook. By these meetings he connected himself personally and by correspondence with men of intelligence, activity, and industry—that portion at least of the agricultural body whose general knowledge and energy were far in advance of the great majority of farmers of that day, and thus, directly and indirectly, he greatly aided in propelling onward the art of agriculture in this county. After the establishment of this club, the system of Farmers' Clubs became rapidly established throughout the kingdom. Mr. Poppy is not what is generally termed an educated man, but his mind is one of no common calibre, and its strength and rugged energy have to a great extent supplied the want of educational tact. His practical suggestions have ever been deservedly esteemed by those who did not fear to travel out of the beaten tracks. He adhered to his plans with a degree of steadiness which some called obstinacy, but he was always determined that his experiments should have a fair trial, and all parties admit that his observations are acute, correct, and judicious.

In 1850, our experimentalist, being nearly eighty years of age, left the farm, and retired with his aged partner to a small cottage that overlooks every field on the farm, the cultivation of which he had so long superintended. The time at which he quitted his occupation was a bad one, stock and crops sold at very low prices, thereby greatly reducing even the limited means which this aged couple had to depend on for subsistence during the remainder of their days.

Charles Poppy is not like Tull, a gentleman of ancient family; nor like Stillingfleet, the grandson of a bishop; nor like Arthur Young, a Fellow of the Royal Society; but he is a practical agriculturist, who, in proportion to his means, has done more, by experiment and correspondence, to advance the agricultural art in this county than any other man living, and as such is worthy of all honour.

THE PROPOSED ESSEX AGRICULTURAL ASSOCIATION.—The adjourned meeting of the committee appointed to promote the establishment of an agricultural society in the county of Essex, took place on Friday, March 26, at the Shirehall, Chelmsford; Mr. C. Du Cane, M.P, in the chair, Mr. Bramston, M.P., one of the other county members, and a considerable number of gentlemen connected with the agriculture of the district, were present. The hon. chairman stated that 84 vice-presidents at £5 5s. each, 39 members at £2s. 2s. each, 151 members at £1 1s. each, 24 members at £1 each, and 269 members at 10s. 6d. each, had been enrolled, in all 517 gentlemen. The surplus arising from the local fund raised for the Chelmsford Meeting of the Royal Agricultural Society was about £815, and there was, therefore, a sum of £850 available for the inauguration and establishment of the association. With regard to the rules, the chairman further stated that he had prepared them, having previously received copies of those governing the Suffolk and the Bath and West of England Societies. The hon. gentleman's code, which he read, was adopted, with a few slight alterations. It provides for the management of the association by a committee of 24 members, chosen equally from the northern and southern divisions of the county, and that no political discussions shall be introduced into the society, which is to be devoted exclusively to agricultural objects. The meeting resolved on the appointment of a secretary at a salary of £50 per annum, and Mr. W. Tuffnell undertook to act as treasurer. It was also determined, after some discussion, that the first exhibition of the association should be held at Chelmsford, on Tuesday, June 15, and the meeting adjourned to March 26, for the reception of a schedule of prizes to be prepared in the interim, and to be then submitted for approval.

MANURES FOR GREEN CROPS.

At a numerously attended meeting of the Western District of Mid-lothian Agricultural Association, held at Mid-Calder, on Tuesday, the 1st December last, Peter M'Lagan, junior, Esq. of Pumpherston, in the chair, the following able paper on the "Manures best suited for the Turnip Crop" was read by Mr Rowat, Currievale:

The results of a few experiments with different kinds of manures are all I have to lay before you. I have no historical account of the various manures now in use; nor have I anything to say of their chemical properties. There will doubtless be a difference in the opinions of many here as to the comparative merits of different manures; but I think you will agree with me as to the necessity of applying manure of some kind if we expect to raise a prolific green crop. We all know that in carrying away from the land a crop of any kind, whether cereals or root crops, we are robbing the soil of chemical properties which must be returned to it again in one shape or other, if we would maintain the land in high condition; and perhaps one of the most difficult problems for an agriculturist to solve is the one now before us—What is the kind of manure which, at the least cost, will raise the largest green crop, and at the same time leave the land in the best condition for the succeeding rotation? A thrifty housewife, on one occasion, presented a friend who had called with skim milk cheese, bread and butter, by way of refreshment. He deliberately spread a slice of cheese with the butter, saying, "I restore unto thee what was feloniously taken away;" and if we wish to raise luxuriant crops of potatoes and turnip, we must restore to the land the chemical properties which previous crops had carried off. Manuring land is no modern practice. It is quite true some agriculturists in the present day profess to grow a succession of crops for a series of years on the same land without applying manure of any kind—and the evidence that this has been successfully done seems so complete that we cannot dispute it. Still, I think you will agree with me when I say that even in the Lothians, which has been styled "the garden of Scotland," we must apply manure, and that, too, with no niggard hand, if we expect to raise a crop that will cover seed, labour, aud rent. In the wheat-growing districts of Canada, where the soil is so rich that the farmers for years did not require to give it manure, now, instead of carting their manure to the river side as the easiest mode of getting quit of it, they collect it carefully and apply it to the land. Chemical science has done much for agriculture in analyzing soils, testing the manurial qualities of various substances, and thus guiding the practical farmer to the kind of manure best adapted for the respective soil and crops to which they are applied; and yet, withal, agricultural chemistry may be said to be yet in its infancy, although it has attained to the ordinary span of human life. Yet it seems to have received no attention from practical agriculturists until Liebig published his work on the "Application of Chemistry to Agriculture." This work produced a considerable impression at the time amongst farmers, some of the more sanguine imagining that a new era had dawned upon agriculture. Greatly increased crops were to be raised by new manures, adapted to each description of grain and root crop, at one-half the former price. But alas! we all know to our cost that ever since, notwithstanding all the aid of chemistry, manures of all kinds have been gradually rising, till last season we paid a higher price for them than we ever did at any former period. Let me not be understood as speaking lightly of the aid which chemistry renders to agriculturists in judging of manures. So far from it, I believe that we may on good grounds cherish the hope that this abstruse science will yet discover for us more plentiful and consequently cheaper supplies of artificial manures. Years of patient analyses and experiments may be necessary. Let us be patient.

Let us remember what chemistry has done in supplying us with manures in time past. Thirty or forty years ago, when turnips began to be more extensively cultivated, all the farm-yard manure that could be collected was found quite inadequate. Bones were introduced, and with marked success, especially in sharp soils. Then by the aid of chemistry these bones were dissolved, and the quantity formerly reckoned necessary for an acre was found amply sufficient for four. But even with all this multiplication of the power of manure, it was found insufficient for the land under green crop. Then some sixteen or seventeen years ago guano was introduced, which met the desideratum for the time; and now, when farm-yard manure, bones, dissolved bones, guano, &c., &c., are all found unequal to manure the vast extent of land under green crops, I doubt not some substitute will be forthcoming in the time of need. To chemistry all eyes are at present directed, and I trust they will not look in vain. It is but a few months since that wonder-working science resolved the gas contained in our Torbanehill coal into a liquid, which I know some of you are pouring into your lamps, and obtaining a good light for a half-penny a night; while a wick the length of your finger will last you a twelvemonth. If that eagle-eyed science which detected the liquid gas in the dark coal-beds of Torbanehill, and made it equal if not to the light of day, at least, to a gas light more brilliant than any light these dark December days can boast, is it too much to expect that she will unlock the vast storehouses of Nature's laboratory, and bring forth the many rich fertilizers lying dormant, whether it be from the enormous beds of nitrate of soda in South America, or the deposits of fossil remains of whales, sharks, and other gigantic monsters of the deep that in some remote period of the earth's history seem to have sported their short-lived day in our seas, and had their bones deposited in the south of

England for the use of the British agriculturists of the 19th century?

To make use of a Yankee expression, I believe in chemistry, and it its power to guide us in the choice of manures. But I have still stonger faith in experiments, although these are not always safe guides. There are so many circumstances to be taken into consideration—the character of the soil, climate, period of sowing, the season, &c., &c., that implicit confidence cannot be placed in any one experiment; but if year after year we make trials of manures on different kinds of soils, and carefully ascertain the results, we shall be able to arrive at general conclusions on which we may depend as safely as any chemical theory, however beautiful.

Farm-yard manure, guano, ground bones, charcoal manure, and dissolved bones, are the manures I have made the experiments with, the results of which I now beg to lay before you. In the season of 1856 I tried six different lots of three drills each. The

First was manured with 5 cwt. Peruvian guano per Imperial acre, and yielded—21 tons 1 cwt.

Second, with 5 cwt. dissolved bones—17 tons 1 cwt.

Third, with 5 cwt. charcoal manure—12 tons 9 cwt.

Fourth, with 2½ cwt. each guano and dissolved bones—18 tons 15 cwt.

Fifth, with 2½ cwt. each guano and charcoal manure—21 tons 1 cwt.

Sixth, with 1½ cwt. each guano, charcoal, and dissolved bones—20 tons 2 qrs.

I ought to explain that the turnips were not sown till the 19th of June, quite too late to sow green top yellow, especially in such a season as 1856, and hence the crop was a very small one. I also weighed the same lengths of 3 drills of the same variety of turnips sown on the 24th of May, and manured with about 30 tons of farmyard dung, ploughed in December, and 1½ cwt. each dissolved bones and guano, applied in the drills, which yielded 27 tons per imperial acre.

This season I had a trial of seven different lots, manured as follows:—

First, manured with 6 cwts. of Peruvian guano, weighing 26 tons 19 cwts.

Second, manured with 6 cwts. Patagonian guano, cost about 10s.—26 tons 13 cwts.

Third, manured with 9 cwts. dissolved bones—22 tons 18 cwts.

Fourth, manured with 6 cwts. do. from the same manufacturer, but much drier—25 tons 11 cwts.

Fifth, manured with 6 cwts. dissolved bones, from another manufacturer—22 tons 19 cwts.

Sixth, manured with 10 cwts. do.—22 tons 10 cwts.

Seventh, manured with 3 cwts. Peruvian guano and 3 cwts. charcoal manure—25 tons 18 cwts.

These weights are all per imperial acre. I may state that Mr. Davidson and Mr. Cunningham were kind enough to assist me in measuring the land and weighing the turnip.

I tried another lot, manured with about 30 tons farmyard dung and 1 cwt. each guano, charcoal manure, and dissolved bones, which yielded 33 tons. The turnips in this last were Swedish variety: the others were all green top yellow.

I have been in the habit of making a few experiments with different kinds of manures every year. Up till last season I always found dissolved bones to yield as large a crop, or nearly so, weight for weight, as guano, and certainly the largest crop for the money value of the manure, while its effects on the land were more lasting. Whether the deficiency the last two years arose from the wetness of the season or the quality of the manure, I know not. I dissolved the bones myself previously, but I had them from a highly respectable party, and do not believe they were in any way adulterated. I was in the habit of using bone meal, or the riddlings from the bones, to assist in drying them The addition of a portion of dry bone may perhaps account for the different result. Dissolved bones, I have observed, give a great stimulus to the young turnip plant, and by sending it rapidly on, it is sooner beyond the reach of that horrid enemy of the turnip plant—the fly. In this respect it excels all other manures except guano. You will observe one remarkable result in the lot with 10 cwt. of dissolved bones; the yield is no greater than with 6 cwt. This would not have surprised me had guano been the manure, but with bones it is to me altogether inexplicable. In making a calculation of the cost of various manures used in these experiments, Patagonian produced the largest weight of turnips for the money cost, but inferior guanos are not to be depended on, with this exception. Half charcoal and half guano produce the next greatest weight of turnips for the money, reckoning the charcoal manure at 5s. 3d. per cwt. and the guano at 14s. Dissolved bones are the next cheapest.

Perhaps it may be expected I should say something of the manures best adapted for potatoes. I am not a large potato grower, seldom having more than eight or ten acres, and therefore leave that subject to another. I may state that I this year used 1 cwt. each of charcoal, guano, and dissolved bones, with farmyard dung ploughed in in autumn. A small portion of the field had 3 cwt. of guano, without charcoal or bones, and I could observe no difference in the produce. One word as to the Edinburgh Police Manure. I have found it suit well on stiff soil, but on lighter land I would decidedly prefer the one-half quantity of farmyard dung. I know this does not correspond with the experience of some of the most intelligent farmers of the district, who compare it with other manure in the proportion of three or two. One serious drawback to it is, you have even on this calculation three tons to load, cart, and spread, for two of the other, and it will take nearly double the time to fill and spread it. If liquid manure could be applied to turnips, I believe it would surpass every other manure for that crop. Some time ago, in transplanting some Swedes, I took urine from the tanks, and applied it after the turnip was transplanted, and its effects were very powerful.

The CHAIRMAN expressed the great satisfaction he had had in listening to the very able and suggestive paper of Mr. Rowat. It had brought out prominently a most important point, which was well worthy of our best consideration, viz., *the most* *profitable quantity of manure to apply to our crops.* Every one present acknowledges the principles of high farming—we must be liberal to the soil if we expect it to be liberal to us. But within the last two or three years there are many instances in the best-farmed districts of Scotland in which these principles have not been judiciously carried out. Owing to the high price of farm produce, and the facilities afforded of obtaining manures, the error with the best farmers has been rather over-manuring, producing an over-luxuriance of the cereals, very much to the loss of the farmer. By all means let as much manure be applied as will give the most profitable return to the farmer; but having ascertained the quantity that will produce that effect, let care be taken that it be not exceeded. Were the cost of a ton of turnips to be counted up on some farms of particular kinds of soil, and where large doses of manure had been applied, considerable astonishment would be felt at the expense. In some cases which came under our observation this season, we found that the cost of raising a ton of Swedes was 12s. Now, turnips seldom pay more than 6s. or 7s. per ton when used for feeding, and this year there are not many feeders that will make more than half that sum. These remarks have been suggested by an experiment of Mr Rowat's, where 6 cwts. of dissolved bones per acre gave as large a crop as 10 cwts. of the same substance. It will be said that the 10 cwts. will tell upon the succeeding crop. True; but why apply the extra 4 cwts. to the turnip crop. The money paid for it would have been much better lying at interest in the bank, or applied in some other way for a year till the next crop was sown. But we maintain besides that there is considerable loss in the manurial value of the superphosphate by applying it to the soil a year before it is required. Another important fact stated by Mr. Rowat is that charcoal manure, which possesses by itself a comparatively inferior manurial value, is found to produce as great an effect when mixed with Peruvian guano as an equal weight of guano. We can account for this in no other way than by attributing the effect to the property which the charcoal has of fixing the ammonia of the guano. But though we have tried before now other substances which had the same property, we have never obtained such favourable results. The success attending Mr. Rowat's experiments certainly warrants a trial of the same substance used by him. The following are two experiments performed by me, the one in 1856, and the other in 1857. In the first experiment, the whole field was manured with good farm-yard dung at the rate of 20 tons per imperial acre, and all the substances were applied at the rate of 26s. 6d. per imperial acre. As there was considerable variety in the condition of the soil in the field, I thought it better to make a series of experiments over the field instead of one equal portion of land being taken in each experiment, and the produce of adjoining ridges weighed—

	Tons.	cwts.
First Experiment.		
Dissolved bones and Peruvian guano gave	6	2
Steamed bones do. ..	6	3
Second Experiment.		
Steamed bones and Peruvian guano ..	6	1
Dissolved bones alone	6	7
Third Experiment		
Dissolved bones alone	5	17¾
Steamed bones alone	5	19¼
Fourth Experiment		
Leone guano alone	4	7½
Leone and Peruvian	5	12¼

Last summer a small quantity of guano from the West India islands was sent in for experiment by the Messrs. Cunningham. Turnip sowing was nearly over when it reached me; but still I determined to try the experiment on a portion of a clay field in not first-rate condition.

	Tons.	cwts.
4 cwt. of Peruvian guano per imp. acre, gave............	4 13	0 of tops. 11 of roots.
8 cwt. of West India guano per imp. acre, gave...........	2 11	15 of tops. 10 of roots.
2 cwt. of Peruvian and 4 of W. Indian per imp. acre gave	3 15	7 of tops. 1 of roots.

Messrs. Glendinning, Hatton Mains; Allan, Clifton; Walker, Kilpunt; Black, Newyearfield, also took part in the discussion, detailing the experience of the application of different kinds of manure. Two experiments mentioned by Mr. Rowat gave rise to considerable discussion, viz, those in which it was found that 8 cwt. of dissolved bones produced as large a crop as 12 cwt. of the same substance, and where 4 cwt. of guano, mixed with 4 cwt. of charcoal, at a cost of £3 16s. produced as large a crop as 8 cwt. of guano alone, at a cost of £5 12s. The opinion of the meeting appeared to be that every farmer should ascertain for himself, by experiment, the proper and most profitable quantity of manure to apply per acre on his farm according to the condition of each field, so as to raise the fullest crop; and that having ascertained that quantity, it would be injudicious to apply more, as a larger crop of turnips would not be raised, while there was a risk of injuring the succeeding grain crop.

The Chairman concluded by moving a vote of thanks to Mr Rowat for his excellent paper.

HOLLY (Ilex aquæfolia)—Common holly—is one of the very best shrubs or trees we possess, displaying either character, according to situation, age, and application of art; it is found (according to London) in most parts of Europe, in North America, Japan, and in Cochin China. In Britain it is found congregated in natural woods and forests: but for the purposes of this article (viz., in hedges) the holly stands pre-eminent. It will not be necessary here to describe the somewhat tedious practice of raising the plants by seed; we will suppose that a hedge is intended. It is always necessary to well-trench the soil, and prepare a space sufficiently wide to receive the plants. That their roots ramify by adding to the original a portion of well-decomposed manure, or rich compost would be aswell. Then say in September or October, or in April or May, select from some respectable nurseryman plants that have been repeatedly removed (this point is of great importance to insure success), of such size as suits the taste or means of the purchaser; but we will start with a plant one foot high, which should, when well established, receive proper pruning by cutting in, to the required breadth, such irregular or luxuriant shoots that project beyond the limit allotted to them: this concentrates all the energies of the plant to the purposes intended—the forming a good hedge. After two or three years, it may be found necessary, perhaps, to stop a few of the most naked and strongest leaders, should they start beyond an ordinary growth; otherwise there might be hollow places found, which would spoil the general effect of an even outline. It would, under every circumstance, be advisable to use a knife, and not the shears, as they rather mutilate the plants; in fact, it is a barbarous practice at all times, to apply the shears to good evergreen hedges. Beyond an occasional top-dressing or a little mulching, the work is done, and the extra pains taken in the early growth of hollies will amply repay the planter for his trouble, and he may in after-years look with pride on his handy work.

THE GROWTH AND MANAGEMENT OF WOOL.

At a late monthly meeting of the Haddington Agricultural Club, Mr. Gaukroger, wool merchant, of Haddington, said he had been called upon so unexpectedly to preside at that meeting, and had latterly been so much engaged in buying and packing wool, that he had no time to prepare a few remarks anent the growth and management of that staple commodity. It might be assumed, however, that any one practically acquainted with that branch of commerce could not be at a loss for a few words on the subject. The first step incumbent upon those aspiring to become growers of first-class wool, is to be particular in obtaining a clean, healthy, and pure stock. Take for instance the sort of wool most in demand at the present moment—half-bred hogs—in order to obtain the extreme prices now going, there must be no infusion of blackfaced blood. Let it be as remote as you like, it will show itself in a greater or less degree, and, wherever prevalent, seriously deteriorates the value of this class of wool. They shall be crossed for years, and crossed again, till not the slightest symptoms can be discovered in the head or legs of the sheep; but to a judge the tinge of blood is at once detected in the wool; it is heavily britched, and hardly ever free from kemps—a vile, thick, dead white hair, that all staplers and manufacturers have a great repugnance to. In a pure stock this objectionable hair is sometimes found, but generally in aged sheep; old ewes, for instance, that are draughted from breeding stocks, and sold to low country farmers, who make them and that year's lambs fit for the butcher. To produce a sound-stapled wool, it is necessary that the sheep be regularly fed; what I mean is, that they be not allowed to go back in condition, for where this is permitted, it shows itself no less in the wool than the mutton; moreover, the wool can never afterwards recover its strength, and at that point where they have been pinched of meat, the wool will be tender, and break, and will not comb, but only fit for weft or carding, and is consequently not so valuable as sound combing wool. The stronger you feed, the wool will be the longer and heavier, but not the finer haired—medium feeding is best for combining quality with a fair sound staple. The *North British Agriculturist* of May 20th, in speaking of salve or laid wool, strongly approves of not clipping the sheep till the wool is again greasy with its natural secretion. I believe this to be a good plan for laid wools, but for white wools it is not; the sooner the sheep are clipped after the wool is thoroughly dry the better—buyers don't like to see greasy, "yolky" wool, and wont give a top price for it. Provided the weather is favourable for drying, 4 to 6 or 8 days is long enough, and not 14 or 20, as some people might think. Another important feature, although a very simple one, is the winding up, or what is termed in Yorkshire the "lapping." This is too often neglected; the servant, in many instances, is careless, and does not clean the fleece of all dung, dirt, tar, straw, &c. I believe this is never done with the knowledge of the master, but they cannot be too particular in cautioning their servants in this respect. There is a law passed for the protection of manufacturers and wool-staplers, making this a serious offence, and punishable by a fine upon every fleece so falsely wound, as well as the entire forfeiture of such fleeces, and the case to be disposed of in a summary way before a magistrate. It is, perhaps, not out of place my alluding to this. I don't think it has ever been acted upon in this country. I am sure no one would like to take abvantage of the servant's mistake, as the farmers would not be cognizant of it, and are a courteous, gentlemanly, and hospitable class, which of itself even would debar any one from going to such "straits." Some districts have deservedly a better character than others for the growth of the wool. East Lothian cannot and never could compete with the border—Roxburgh and Berwickshire. These districts are famed in Yorkshire and France for what is termed Northumberland wool (which includes the wool of Northumberland, Roxburgh, Berwick, East and Mid-Lothian), and always brings higher prices. This is to be attributed to the soil and climate of those districts being better adapted to the growth of wool, and being more what is termed a wool-growing country, greater attention is paid to it. In this county there is the greatest difference possible—some places grow much better wool than others; go down to the low country and near to the sea, and then to the parishes of Salton, Gifford, and Bolton, and you will find a startling superiority in favour of the latter;—the former wants that bright rich colour and full wholesome appearance of the latter, and has a dull, "reeky", unkind aspect, and is wastier. I must state, however, that in spite of soil and climate, and the keeping of "flying stocks", there are some praiseworthy exceptions in the northern division of the county. It does not follow that the richest and best corn land produces the best wool. I can understand a farmer supposing that; but such is not the case. The best Cheviot laid is grown in Sutherland, and some beautiful half-bred wool in Caithness, whilst the best Cheviot white is grown on the Cheviot hills and district. Again, East-Lothian wool is, I believe, preferred to West-Lothian, Fife, and other places. In this age of competition, and when wool is so very high in price, it is the interest of those who wish good prices to give this matter their consideration. Wool is not "penny pies" now: prices will vary considerably for the same description, as it is the best wool that is wanted, and buyers prefer paying at all times a good rattling price for a superior article, to a shabby price for a slovenly got up one. A good lot, when bought, is half sold to the consumer, but a bad lot sticks long, and it is up-hill work to quit it, and frequently spoils one for a future transaction. I have been taken so much at unawares that nothing else occurs to me at present, but shall be glad to hear any member's opinion on the subject.

Mr. Dowell (of Dowells & Lyon) wool broker, Edinburgh, having been introduced to the meeting by the chairman, said—From the exceedingly courteous invitation of Mr Harper to appear here, I considered it would have been most unbecoming if I did not cheerfully respond to his wish by giving a few remarks in extension of our circular, the more particularly as it touches the most important product of our island; and in following this up, I might justly be accused of arrogance, if I did not at the outset declare it was not from personal practical experience that these remarks were founded on, but what is more valuable—from the experiences of many who have enthusiastically devoted their energies in the furtherance of our native manufactures. In conversing with practical men, both producers and consumers, more particularly the latter, one feels thoroughly convinced there is still a vast field open for improvement in the getting up of the wool; and let it not be considered I am running away with the harrows too fast, when I assert that in wool there is as much room for improvement as there was in days not long gone by, when guano and artificial manures were unknown in agriculture; nevertheless, it must excite a pleasing sensation in the breast of every well-wisher of his country to observe the gradual, but marked attention, which has of late years been bestowed on rural affairs. To men of all ranks of society, agriculture seems now to be the favourite study, not only of the landed proprietor and practical farmer, who are more immediately interested in its improvements, but also of the philosopher or man of science, who, instead of wasting his time and talents in useless metaphysical disquisitions, now devotes them to agricultural researches, which, redound to the benefit, not of a few individuals only, but to the community at large. When we consider the wool of this country alone warms almost every class of society, gives employment to thousands in its manufacture, and engages whole fleets in its exportation, it should excite within every one of us a lively interest in its progress; and in a national point of view, it must be gratifying to know that the tartan and the tweed are eagerly competed for in every clime: and it affords us no ordinary pleasure to notice that the managers of some of the largest charitable educational institutions of our country have at length seen the propriety of clothing their youngsters with the becoming garb of Scotch tweed. Little does a careless farmer know of the trouble occasioned to a manufacturer from ill got up wool; and if he would but for a moment reflect on the vast amount of capital involved in machinery, it should prompt him to be more careful; and when we read of, and daily hear of, hill farms increasing in rent from 12 to 45 per cent., surely it is but hopeful that every improvement should be attempted to increase the value of the crop, whatever it may be. This I humbly submit, can only be done by care in selecting the stock; and as we are particularly on wool, the careful washing is of the highest importance to the manufacturer, inasmuch as it yields more weight of yarn, enables him to put a greater quantity through the carding process, as it does not clog up the cards speedily. Its freeness not only makes it spin more sweetly, but makes a better thread; hence it is more valuable to the manufacturer in many respects, and he well knowing the qualifications of well washed wool, is ever desirous of acquiring it even at a considerable advance. Bright-haired wool is much desired and eagerly sought after by the manufacturer, being far more valuable to him than wool tinged with the yellow hue; the production of a pure white wool free from all tendency to clamminess is what wool-growers cannot be too ambitious to attend to, and the attainment of this object depends very much on prompt attention being paid to early clipping after the sheep has been thoroughly washed and dried. Wet or unsettled weather may interfere with such an arrangement; but, generally speaking, the delay is attributable to the idea that farmers entertain, that they gain by weight when shearing is postponed. In this they are greatly mistaken, for they sacrifice the beautiful white appearance of the fleece, a quality which cannot be too highly estimated, and which the manufacturer invariably keeps in view in the advance of price. Considerable loss is often experienced in the deterioration of wool, by allowing a flock after washing to be turned into a place where sand or moss rubs are prevalent; great care ought to be exercised in avoiding such, and in procuring the best place till the clip is finished. Of late years complaints have been on the increase from the French buyers, who have been large competitors, that kemp hair is far too often found in flocks; this should be particularly studied, and every experiment adopted to devise the means of eradication. Allow me now in a few words to draw attention to the advantage of disposing of the wool by auction, and let it not be considered I am too one-sided in this opinion, but believe me it is from an honest conscientious conviction that I am advising for the best: established usage, old connections, and an indifference to change, makes the task to prove the fact all the more difficult; but can the enlightened farmer of the 19th century not see that when wool is collected into a well-lighted store, placed in competition with others of a worse or better sort, and when the direct competition of some 40 or 50 bidders come into play, each sort receives its just reward according to the care it has been got up with? How infinitely better then is this plan, compared to what we hope some day to see entirely exploded, viz., of accepting from the old dealer his idea of the value, and the giving of the same price in localities, let them be ill or well washed. In saying this, let me not be misunderstood by a highly intelligent and gentlemanly class of dealers, who have long occupied the wool field—that I wish to take the butter off their bread, and perhaps their bread as well. I wish even to show them that sales would decidedly be to their advantage, and why. Look at the enormous expense they are put to, in travelling the country; whereas at sales they would get what they required, with a tithe of the trouble and no expense; they would thereby be better remunerated by receiving a commission for so buying. Have we less intelligence than our American and Australian neighbours, who have long seen the advantage of sales? Certainly not! Still we are only waking up to appreciate what they have long enjoyed and benefited by in purse. Sales are now springing up in all quarters; but unless one general central market be adopted, it is easy to predict the issue; and another fallacy is the frequency of the sales. To suit all, more particularly the buyers from distant parts, set periods, such as the London practice, should be adopted, and we will ever endeavour to advance with the times in lending our aid to improve every method that will tell to the benefit of the grower. In conclusion, allow me to thank you for this opportunity of expressing my opinions, and as I was an aspirant to the enviable position of an agriculturist under the able tuition of Mr. Steedman of Boghall, I am proud of the opportunity of meeting so many intelligent cultivators of the soil.

The following members also took part in the discussion—Mr. Douglas, Athelstaneford; Mr. R. Scot Skirving, Campton; Mr. Durie, Standingstane, &c. The discussion ultimately was adjourned till next meeting, so that Mr. Harper's views on the subject might be obtained.

THE MANAGEMENT OF GRASS LAND.

1. The best mode of Laying down Land to Permanent Grass, &c.

In laying down land to permanent pasture, the first point to be attended to is its thorough and efficient drainage; for without this all-important preliminary, no matter how the other operations are conducted, disappointment will finally ensue. We need not enter into any lengthened account of the manner in which draining is performed, for the details are generally well known; but this much we must say—the drains ought not to be less than four feet deep, and, as a *general* rule, not more than 21 feet apart. We are aware that there are many persons who do not consider it necessary to drain pasture land, or what is intended to become such, as closely as they would do land intended to be under regular cropping; but we consider this to be mistaken policy. Unless the land is naturally dry, it must be rendered so artificially; for if this is not done, coarse grasses will displace those finer descriptions which may be sown, and coarse grasses are always innutritious.

Taking it for granted that the land intended to be laid down in permanent grasses has previously been under a lengthened course of rather severe cropping, combined with, perhaps, careless general management, we would beg to detail the steps which we have in many instances of this kind adopted, for the purpose of preparing and finally laying down the land to grass.

After draining, and when the surface soil is shallow and the subsoil retentive, it is of the utmost consequence to deepen it by subsoiling. We have had experience of land being laid down to grass both with and without subsoiling; and in every instance where it was omitted, if the subsoil was of a retentive character, we have invariably been led to attach a greater amount of importance to this operation. We have deepened land by means of the subsoil plough, and also by manual labour; and although in the latter case the expense was considerable, still we found it remunerative. Generally speaking, however, the subsoil plough will be found sufficient to answer the purpose. Subsoiling must in no case whatever be put in the room of or used as a substitute for draining, as it has been done by some persons. This would only lead to disappointment, and very likely to undervaluing what is in reality a most important operation when properly performed, and in its proper time and place.

The eradication of weeds is indispensably necessary, and it is impossible to be too careful and minute in conducting this preliminary operation. When the land is very foul it may be necessary to resort to a bare fallow, particularly when the grass seeds are to be sown in autumn. At the same time, even very foul land may be cleaned during the preparatory operations for a root crop, and in the summer culture of the same. By this, we mean turnips or mangel wurzel, drilled or (as it is denominated in many parts of England) ridged, from twenty-seven to thirty inches apart; any closer intervals will not permit the horse-hoe and grubber to act efficiently. When a root crop is grown, the grass seeds cannot be sown until the following spring. In the case of potatoes, indeed, the crop may be removed in time to permit sowing in autumn; but unless the land is already tolerably free from weeds, potatoes do not answer well as a preparatory crop, so far as the eradication of the weeds is concerned, because the potato must be planted at so early a period in spring as to prevent a thorough cleaning of foul land. When the autumn cleaning of stubbles can be carried properly into effect, preparatory to growing a crop of potatoes, then such a crop will be found very favourable indeed to the growth of sown grasses. In whatever mode the eradication of weeds is performed, whether by bare fallowing, or in the cultivation of root, or, as they may be more correctly designated, fallow crops, the operation must be done effectually, and not hurried or slurred over. The couch-grass rake, which is used in many parts of England, will be found a useful auxiliary in the earlier stages of the business, but it ought not to depend altogether on this, but must be followed by careful hand-picking. Joints of couch-grass, small dock roots, and various other weeds, will escape the rake, and these can only be effectually removed by the hand. Hand picking, no doubt, adds to the expense; but it is nevertheless absolutely necessary, if it is desirable to lay the land down in a proper manner.

It is of no use attempting to lay down land to permanent grass if it is in poor condition, or what is called *out of heart*. When potatoes are the preceding crop, and autumn cleaning can be carried into effect, the manuring ought to take place before the land is rough-ploughed previous to winter. This manuring ought to consist of not less than 25 to 30 tons of farm-yard dung, and it is not necessary that the manure be fully decomposed. By the spring it will become incorporated with the soil, and there is a greater probability of a sound crop of potatoes than would be the case if the application of the manure was deferred until the planting season. In the spring, and immediately previous to planting, when the manure was ploughed down in autumn, is the proper time to apply lime. The quantity necessary depends on the nature of the soil; but in the case of loams of a medium character, that is, neither a heavy clay, nor a light, moory, or sandy soil, we have been in the habit of using from 120 to 150 bushels of lime per statute acre as it comes from the kiln. If it is not convenient to apply it in spring, the operation may be deferred until the removal of the crop. In this case we would sow eight to ten bushels per statute acre of half-inch bones broadcast, previous to planting the potatoes. In all cases which have come under our observation, we have seen that bones are almost an indispensable necessary when laying down land to permanent grass. We may be permitted to mention one case in particular as an illustration. In laying down a field of rather stiff clay loam, which had been previously heavily limed, to a part of the field bone-dust was applied, whilst the remaining portion was laid down after farm-yard manure. The boned portion was in the middle of the field. Ten years afterwards the boned land could be plainly distinguished from the rest of the field, even at a considerable distance; the turf was closer and greener, and always closely eaten by whatever stock was grazed in the field, but especially by sheep.

After the potatoes are removed, say early in September, the land must be harrowed, and all weeds carefully removed. After this apply the lime, or bones, if not done in spring, and then set the two-horse grubber to work, stirring up the soil thoroughly, both across the field and lengthways. Taking for granted that the land is either naturally or artificially dry, it will be best to lay it down to grass in a level state, that is, without furrows; and the action of the grubber ought to be quite sufficient to make an excellent seed bed. The seeds are then sown and the land harrowed, but not rolled, unless in the case of very dry, sandy, or sharp land. We shall afterwards refer to the kinds and quantities of seeds to be used.

When turnips or mangel are the crops which precede grass, the liming ought to be done immediately after the removal of the previous grain crop, before the land receives the winter furrow, so that it may be thoroughly incorporated in the soil before the application of manure for the root crop. The farm-yard manure, not less than 20 tons per acre, in combination with bones, will be applied, of course, immediately before sowing the turnip seed. As turnips do not perfect their growth until it is too late to sow grass seeds, and very likely being either wholly or in part consumed by sheep (if so, so much the better), the sowing of the grass seeds must be deferred till spring. In this case, as soon as the turnips are removed or consumed, the land must be ploughed in very broad ridges or lands, say fifty or sixty feet wide (still taking for granted that the land is dry), and even wider, if convenient. In this state it will lie until spring, when, if the crop has been entirely removed, and not consumed either altogether or partly by sheep, after the land has been thoroughly operated upon by the grubber, 2 cwt. per acre of Peruvian guano may be harrowed in, the grass seeds sown, harrowed, and rolled.

If the land is bare fallowed, preparatory to being laid down to permanent grass, we would strongly urge the necessity of being most particular in conducting the various operations of ploughing, harrowing, and weed picking, because we have not unfrequently seen bare fallows which could only be called fallows by courtesy. The land certainly was not in crop; neither was it, properly speaking, in grass; but it was bearing a luxuriant crop of couch and other weeds; and instead of attempting to remove these, their growth was merely retarded for the time by an occasional ploughing. We have, indeed, known in more than one case a crop of couch-grass hay to be taken off these so-called fallows. "THOROUGH" must be the motto, whether it relates to draining, manuring, working of the land, or eradicating every vestige of the weeds by which it is infested.

The kinds and quantities of grass seeds to be sown are regulated by the nature of the soil. On soils of medium quality, the following mixture will be found advantageous :—

Perennial rye-grass, 10 lbs.; Italian rye-grass, 4 lbs.; Timothy, 1½ lbs.; Cocksfoot, 5 lbs.; Meadow Foxtail, 2½ lbs.; Rough-stalked meadow grass, 2 lbs.; Hard fescue grass, 2½ lbs.; Meadow fescue grass, 3½ lbs.; Perennial red clover, 6 lbs.; White or Dutch clover, 4 lbs.; Alsike clover, 2 lbs., per statute acre.

In dry lands intended chiefly for sheep pasture omit the timothy and the rough-stalked meadow grass, and substitute 3 lbs. of sheep's fescue and 2 lbs. of common parsley, both of which are greedily eaten by sheep. In heavy or damp soils double the quantity of timothy as given in the above mixture; and whilst allowing only one-half of the hard fescue grass, add the quantity deducted from this, or 1½ lbs., to the rough-stalked meadow grass. Half-a-pound to one pound per acre of sweet-scented vernal grass may be added or not, in all soils, as pleasure dictates. It is not a valuable pasture grass; but, from the sweet smell it imparts to the hay with which it is mixed, it is to a certain extent useful on this account.

In the great majority of cases grass seeds are sown in spring along with a cereal crop, which is allowed to ripen its seeds; but when permanent grass is the object, the best plan is to sow them alone; that is, any of the cereals sown along with them, for the purpose of shelter, should not be allowed to ripen. When grass seeds are sown in autumn, a bushel of rye per statute acre should be sown at same time; and when the sowing takes place in spring, a similar quantity of any of the cereals will answer the purpose. Rape is an excellent seed to sow along with grass seeds, whether they are autumn or spring sown. From 3 to 4 lbs. an acre, sown broadcast, may be used; it shelters the young plants, and affords a most valuable amount of forage for sheep when pastured on the young grasses.

When grass seeds are sown in autumn, they will in ordinary cases have advanced sufficiently by April to admit of being lightly stocked with sheep. We are not partial to the system adopted by some, in such cases, of stocking so heavily as to eat down the young grasses to the root; for we consider that by doing so many of them are entirely destroyed. It is, no doubt, a great temptation to a man who is, perhaps, short enough otherwise of grass for his ewes and lambs, when he has a field of young grasses forward; but it is better to remove the sheep for a week or ten days at a time, after being grazed, so as to allow the young grass to shoot out afresh. In like manner, spring-sown grasses must be stocked as soon as they are sufficiently advanced to afford a full bite. Cattle must not be allowed to graze on the newly sown lands. In many districts the land is full of small stones, and all which would interfere with the scythe ought to be removed at any early period when most convenient. Some do this as soon as the grass seeds are sown; others defer it until after they have perhaps been eaten down for the first time. In either case, broad-wheeled carts ought to be used to carry away the stones, so as to prevent the formation of ruts, as will be the case when narrow wheels are employed. The frequent use of the roller is highly advantageous in smoothing and consolidating the surface.

Although the production of hay should be an object which it was desirable to attain, the grass ought not to be mown the first year, but entirely consumed by sheep. The second year's grass may be mown, but as soon as the hay is removed, let a wet day be selected to top-dress the field with 1 cwt. of Peruvian guano and 1 cwt. nitrate of soda per statute acre, after which, when the grasses are sufficiently grown, stock again with sheep. The aftermath ought on no account to be mown, neither should a hay crop be taken two years in succession. In the after-management of the land, should a crop of hay be taken, top-dressing immediately afterwards either with guano and nitrate of soda, or with farm-yard manure in winter, must not be omitted. A large extent of naturally excellent grass land has been ruined by a two frequent repetition of a hay crop, accompanied by a neglect of top-dressing.

2. THE RENOVATION OF INFERIOR AND WORN-OUT PASTURES.

In attempting the improvement of inferior pastures, drainage must form the preliminary operation in this as in the previous case. We know many instances where thorough draining alone has acted like magic in effecting a vast improvement of inferior pasture lands, where the grass has been changed through the influence of the drainage from being of the coarsest kind, and greatly disliked by stock, to sweet, fattening pastures, from which it was almost impossible to keep out either cattle or sheep if an open gate or a hole in a hedge could be found by them. In a case to which we would particularly allude, the soil was a very tenacious clay, and had been tile-drained at one time about two feet deep, the drains running across the slope. The grass, however, was never good; but when this land was drained four feet deep, the drains running up and down the slope, and only seven yards apart, in the first year afterwards a great change for the better was manifest, and each succeeding season added to the value of the pastures. To expect to improve inferior pastures which require draining without that operation being carried into effect, is simply to expect an impossibility; and we may be permitted to remark that there are more pastures requiring drainage, and the want of which is the primary cause of their inferiority, than many appear to be aware of. One thing we may be certain of—that as long as there is a single case of rot in sheep, we may rest assured that the thorough-drain has not been called upon to lend its aid in eradicating the evil.

If the land has become fogged, or covered with mosses, the harrow may be used with good effect; and afterwards let the opportunity of a damp morning be taken advantage of, to sow grass seeds over the parts which have been most scarified by the implement.

The application of bone-dust, at the rate of say twenty bushels per statute acre, is, we need scarcely say, a most efficient mode of improving inferior pastures. Instead, however, of putting them on the land in their natural state, another method may be adopted, and which we believe to be the better plan. When grass land is drained—pipes being used as under-ground conduit—let the filling of the drains be finished neatly, without laying the top sod on the surface. Collect these sods, and after chopping them in pieces, form a heap, upon each layer of which spread a quantity of bones, and also coarse salt. There will be thus—first a layer of earth, next a covering of bones and salt, then earth, again bones and salt, and so on, until the heap is say four feet high. The uppermost layer must be of earth. The bones to be at the rate of 20 bush. an acre, and the salt 5 cwt. The former will decompose rapidly, and become absorbed in this heap of earth. It may be applied to the land a month after being mixed, observing to turn the heap carefully over before drawing the compost out on the field. If it is in the power of the farmer to saturate the heaps with the liquid drainings from his farmyard, the value of the compost will be greatly increased.

A compost of earth, lime, and salt is an excellent top-dressing for pastures, and very effectual in improving the quality of the grasses. Let the heap be made in layers as above described, but in this case, after being made up, it must remain untouched for at least six months. Then let two men commence at one end of the heap, and turn it over, carefully intermixing every portion of it, and adding a shovel-full of lime where it may appear to have been passed over lightly at the first mixing. The heap will be permitted to remain for two or three months longer, then turned again, beginning at the opposite end from that which was begun upon the first time. A compost of this kind is better to lie twelve months before being applied to the land, so that the particles may be allowed to be thoroughly intermixed, and also to permit certain chemical changes taking place which the lime and salt will effect in connection with the organic matter contained in the earth, and by which the fertilizing effects of the compost will be increased.

Calcareous manures alone, when used as a top-dressing, will effect great improvements in the character of pastures. We have often applied marl to poor heathy pastures, and the result was that the heaths and coarse bents became eradicated, their place being supplied by natural white clover and other sweet grasses. This practice of using marl alone in the improvement of poor grass lands is common in some districts with which we are acquainted; and *shell sand* got on the sea shore is also employed for the same purpose, and with precisely a similar effect. Even common sand will be found to improve the pasturage on poor clays. We had on one occasion a very striking proof of this being the case. A field of poor, ungrateful clay was laid down to permanent grass, and although it had been previously treated liberally, the grass still was always very thin, and of extremely indifferent quality. A considerable quantity of fine sand was drawn and spread over the worst parts of the field, and from that time the sward began to improve, becoming thicker every year, the bare spaces being filled up by sweet herbage, which did not exist previously.

All pastures which are eaten down by cattle ought to be frequently gone over, and all the droppings carefully scattered. This prevents the grasses from growing in tufts, as in the case where this precaution is not adopted, besides helping to improve the pasture generally.

An unremitting warfare must be waged against weeds, and the most effectual mode of removal is by digging them out. Cutting them down *regularly* at an early stage of their growth will weaken them so much that in course of time they will die out; but this is apt to be neglected until they perfect their seeds, when it is too late, and we therefore prefer recommending digging out instead of merely cutting down.—Irish Farmer's Gazette.

THE BEAUTIFUL IN AGRICULTURE.

Both the art and the science of agriculture are sufficiently advanced in this country to enable its citizens to study and practise the Beautiful in planting, and in all farming operations, with entire success. Beauty in rural objects and scenery is not confined to embellishments, but is attainable in all that relates to plants and their culture, to domesticated animals, forests, parks, fields, orchards, and gardens. Nature kindly favours, and often suggests agreeable features to such as have an eye to see and heart to feel the charms of beauty. She aids in a thousand ways to quicken into life and activity the dormant taste for the Beautiful placed in every bosom by a beneficent Creator. To develop and cultivate this latent and prolific source of enjoyment in mankind, is one of the highest duties of educated persons. It should prompt all to investigate the elements of beauty in natural objects and in rural arts, whether they relate to the vegetable, animal, or mineral kingdom. With each of these grand departments of Nature the cultivator has much to do; and he should learn her processes and laws, from which he will at length fully understand that Beanty and Utility are integral parts of any wise system of farm economy.

If beauty in a country residence, in farm buildings of whatever kind, or in tillage, were incompatible with anything that is useful in agriculture or important in household affairs, the fact would excuse the general neglect of this principle in nature. But so far from being hostile to the creation of wealth, or to its accumulation in the hands of the owners of the soil, Beauty is one of the most reliable elements of money value in every species of property. In proof of this, we cite the facts that a beautiful horse often sells at from £70 to £120, where an ugly one of the same weight and muscular power will bring only a fifth of the sums named. A beautiful plantation has equal advantages over one quite destitute of pleasing and attractive features. As society advances, and the popular appreciation of lovely and captivating expressions becomes more acute and refined, it is obvious that Beauty must appreciate in cash value. Indeed, not one in a thousand knows how to turn to the most profitable account the intrinsic power and the solid merit of the Beautiful in agriculture. It is not, as many suppose, a mere ideal matter, having no foundation in things substantial and enduring; but it is a material part of that perfect economy which owes its existence to the Supreme Architect of the universe. Hence, as planters and husbandmen, it is a part of our highest wisdom to cultivate that faculty within us, which happily discriminates in the varied fruits of the earth, in its ever differing inherent fertility, and its wide range of really valuable plants and animals. We should study to multiply delightful objects and scenes around our homes, and improve such as Nature has scattered with a liberal hand over all our acres, whether few or many.

Let us consider what it is that renders land beautiful for tillage.

Consider the first and most obvious wants of all cultivated ground, and it will be seen that *fruitfulness* is the function most needed. It is, however, no more necessary to successful agriculture, than expressive of natural beauty. A rich soil clothes itself with noble forests; and if these be removed, as on extensive prairies, with the most luxuriant and nutritious grasses. Fruitfulness of the earth being an essential element of rurul beauty, to impair the fertility of land is not merely to diminish its money value for the growth of crops, but to transform a landscape that once inspired universal hope, confidence, pleasure, and industry, into a barren waste, which, when fairly tilled, promises little reward to honest toil, and actually yields less than it promises.

Under such circumstances, it is fortunate that Science teaches us how we can best change a sterile field, or an impoverished estate, into one distinguished alike for its elegance and productiveness. Science also tells us that it is easier and better to *preserve* the natural resources of land, than to restore them when removed in crops, or washed away by many heavy rains falling on shallow-ploughed fields. To avoid loss in this particular, it is important to know the precise things in the soil that form agricultural plants, and how these things are both lessened and augmented in all farming operations. With this professional knowledge, the cultivator may profitably increase the beauty and value of every rood of land on his plantation.

Having a critical knowledge of the constituents of soils and their products, how is one to make a truly beautiful landed estate?

This depends mainly on the circumstances with which he is surrounded. He should examine these with the utmost care, with a view to learn what is practicable, not in itself, but to a man of his means, acquirements, family ties and duties, and powers of execution. Farm buildings and fences of some kinds are indispensable; and in their construction and arrangement his taste and skill will inevitably be revealed to his neighbours and the public. A cultivated taste may be seen as well in the erection of a log cottage as in that of the most costly mansion. Nature displays the Beautiful not only in the lowly and humble violet, but in plants and animals too small to be seen by the naked eye. Wisdom in the designer may be shown as effectively in the arrangement and structure of little things as in large ones. Dwelling-house architecture, whether in cities, villages, or strictly country residences, is susceptible of great improvement, judging from the habitations of the million. These rarely possess either convenience or beauty, or any other merit to recommend them. Even in cheapness, they fail as much as in other respects. The amount of money thrown away by the rich, and those who would fain pass as such, on expensive buildings, shows how little our taste in such matters has been improved over that of savages. Fortunes are often squandered in a few years on misshapen palaces and villas. Some, less extravagant in outlay, are more *outré* in architectural folly, adding to the residence of a private family, by way of ornament, what would appear to be massive columns, but which are generally made of wood, in the ridiculous ambition of appearing to live in something like a Grecian temple. In costly public edifices, columns are appropriate, to aid in supporting the great weight of a marble, granite, or other structure; but nothing is more like an eagle's feather stuck into the matted hair of a savage, than the frail plank pillars or columns, painted white, so ostentatiously stuck out in front or at the sides of a dwelling-house. A worse taste can hardly be imagined. Simplicity, neatness, and quietness ever indicate contentment, gratitude to God, and the promise of a long happy life. Whereas, the straining for effect always suggests unfavourable thoughts, and not unfrequently provokes remarks expressive of contempt rather than of admiration.

Whatever contributes to the comfort of a family at a rural home, adds to its beauty, if properly placed and constructed. Thus, a well-arranged kitchen, with a wood-house, cement cistern for holding rain water, and many other conveniences, are not only matters of interest, but really increase the attractiveness of a family residence. It is the judicious planning, combination, and management of all the affairs, both in doors and out, on a farm, that make the farmer's life happier than that of most other men engaged in different pursuits. He has the constant assistance of those wonderful powers known as vegetable and animal vitality, to multiply his agricultural wealth and beautify his plantation. Groves of forest trees, orchards of fruit-trees, as well as all the benefits of the garden, are at his command. Parks, lawns, and pleasure-grounds he and his children may indulge in, if their tastes appreciate and enjoy such improvements; and it is better to cultivate a taste in this direction, than that which seeks amusement by visiting distant watering-places and the gaieties of cities. To the owner and cultivator of the soil, *home* should be the most agreeable place on earth. There his best thoughts and efforts, his money and his ambition, should find full employment. Absenteeism is fatal to the Beautiful in agriculture. A farmer should not only stay, as a general rule, on his farm, but *live* there, in the best sense of the term. This idea does not conflict with a reasonable amount of travel, either for recreation, or to obtain additional knowledge. Good books are now so cheap and abundant, that a library composed in a large degree of works on agricultural and horticultural subjects, is found to yield both amusement and instruction on better terms and of a better quality than the planter can obtain from any other source. It is quite as easy to acquire a taste for agricultural reading, as for tobacco, tea, or coffee. Man is a creature of habit; and the best way to avoid bad habits in our children, is to fix early in their constitutions pure tastes, the gratification of which will ennoble, not degrade them. To cultivate the Beautiful in rural life has an elevating influence on society, and thereby prevents vice and crime, poverty and suffering.

Nature being the source of Beauty, we are to study her admirable processes as they are made known in the Natural Sciences. Chemistry, Botany, Geology, Vegetable and Animal Physiology reveal to the human understanding a thousand charms in the perfect harmony that pervades every form and condition of matter, and thus perpetuates all the beauties and blessings which call into activity both the gratitude and the reasons of man, The powers within him, and the elements that surround him, act in concert to force his growth in morality and knowledge, that he may become in each succeeding generation at once a happier and a wiser being. In connection with our moral and intellectual development, so natural and so desirable, a higher degree of social and physical comfort is clearly both attainable and susceptible of full enjoyment. It is not every person, in whatever condition he may chance to be, in reference to culture, who is capable of appreciating either the Beautiful in Agriculture or in Nature. Hence, in all nations just emerging from barbarism, husbandry, tillage, architecture, and all other arts, are prosecuted in the rudest manner. Some rise more rapidly than others in every attainment; but time is necessary to the growth of every art and the perfection of every science.

It is humiliating to our pride as a free, self-governing people, to know that in ancient Greece the Beautiful in agriculture and architecture was far in advance of our highest achievements. A thousand years before the birth of our Saviour, Homer describes, in the fifth book of the Odyssey, a landscape in which four fountains of white (foaming) water, each springing in succession, in perfect orderliness, sends the life of vegetation through a meadow in different directions. At that early period, agriculture was sufficiently advanced to have irrigation and meadows properly appreciated by the most civilized nations. We wish we could say as much for the agriculture of our own sunny South. But all must admit, that, with us, neither irrigation nor meadows are regarded as worthy of public attention. It is true, we know the value of hay, and consume many a bale from the North, for which we pay at least twice what it it is intrinsically worth.

Who needs to be told that luxuriant meadows, pastures, and fine stock, add largely to the beauty, interest, and value of a plantation? Irrigated meadows and pastures are an inexhaustible source of manure for enriching the tilled lands on a farm. Where Nature periodically irrigates river bottoms, the plough never exhausts the soil. Running water being Nature's grand restorer in tillage and cropping, why not use it to rejuvenate our old fields, and thus render them at once both attractive and profitable? None of them are so elevated that water does not fall from above them, and run off their surfaces. Properly considered, all th moving water on continents is rain water. It creates, as well as transports from one place to another, the fertility of properly-irrigated lands. The fertilizing influence of water, when judiciously applied to the earth, is well known. It is, therefore, in skilful hands, an invaluable element of fruitfulness and beauty. More knowledge and higher art will one day use water in this country as successfully in agriculture as was ever done in Greece, Italy, or Egypt.

Next to irrigation, we regard the planting of the seeds of all the more valuable forest trees and fruit trees that will grow and prosper in our climate as the most commendable practice, with a view to promote the Beautiful in agriculture. Land is now cheap; and there is a certainty, as population increases, that the demand for lumber and timber, for fruits of all kinds, and for fuel, will increase in an equal, if not a greater ratio. By skilful planting, one may unite beauty and profit in an eminent degree. Black walnut planks are now worth, in all northern cities, from four to seven dollars per 100 feet. With due care, the tree grows rapidly, and its fruit possesses considerable value. A forest of this and other well-known trees would add an interesting feature to any plantation, while the expense of it would be a mere trifle. There is genuine poetry in trees—in their beautiful foliage, their charming blossoms, their delicious fruits, their cool and soothing shade, their stately trunks, waving tops and graceful outlines; and all speak to the eye and soul of man in a language not to be misunderstood. It was in the light and shade of groves that man first erected his most elaborate temples, and there his ascending devotions sought communion with the Creator of all. No wonder that groves were often held as sacred to God, and still oftener made seats of learning—the chosen schools where sages taught, and thousands studied the profound mysteries of the universe. If the history of our race shows anything good in man, it may be stated, to his credit, that noble trees, of whatever kind, inspire something akin to piety in his heart and in his thoughts. Call this, if you please, an oriental feeling: it has been too general and too long continued, not to have an abiding place in the human soul.

It is the crowning beauty of a farm or plantation, to express, in its every feature, both tranquillity and happiness. Disquietude and pain will sometimes come to the best of men; but their continuance should be as short as possible. It is monstrous to suppose that our nerves are made sensitive that they may feel more suffering than pleasure during our existence. Pain and distortion are exceptions; enjoyment and beauty are the true, the natural *status* of all sentient beings. When healthy, and properly fed, the young of all animals are beautiful and happy. Such is the law of Nature; and hence good husbandmen improve their flocks and herds in symmetry of form, in elegance and elasticity of movement, by simply having them always in the enjoyment of suitable food and shelter. These expel deformity in a few generations, and develop Nature's highest beauties. The same principle applies to the feeding and care of agricultural plants. Starve and wither them by ill-usage, and your seed will soon degenerate, your crops fail, and your success in planting be no better than your practice, Nature's beauties, whether in plants or animals, are fed liberally; and in this regard she teaches the cultivator to feed generously his soil, his crops, and his stock. By so doing, his land and all its products will be the best of their kind, assuming good common sense in the primary selection. Fences, buildings, and farm implements should be made of the most durable materials, that everything may indicate the settled purpose of the owner to have such an estate as will support a family in affluence in all time to come. Permanency of occupation and durability of improvements are material elements of agricultural beauty. A witty Englishman has remarked, that in travelling through the United States, most of the houses appear to have been put up Saturday evening, with the expectation that they were to be taken down Monday morning! Much of our farm improvements are of the same frail and ephemeral character. We must learn to do our work better, or we shall greatly damage the State in which we live, by increasing its old fields, and perhaps provoke the curses of our own posterity. To injure the soil over millions of acres is a wrong of fearful magnitude. Would to God that we could see some evidence that the evil will be any less during the life-time of the writer. The error is too old and deep-rooted for that. For a little immediate gain in cotton or grain, our natural and valuable forests, the soil, and the best interests of society are all sacrificed; as if to desolate the earth were man's highest profit and greatest good! Who will try to remedy this obvious social disease, and foster the study of the Beautiful in Agriculture.—American "Southern Cultivator."

PLEURO-PNEUMONIA.

At a late meeting of the Probus Farmers' Club, Mr. William Trethewy in the chair—Mr. Karkeek delivered an able and instructive lecture on "Pleuro-pneumonia."

Mr. KARKEEK commenced by saying that he felt it was unnecessary for him to make any apology for introducing the subject; for although Cornwall had been, comparatively speaking, free from this dreadful murrain—in consequence of Cornish farmers having been for the most part exporters, rather than importers of live stock, and therefore having but little intercourse with infected districts—yet within the last few months the disease had appeared in this county. He believed he was correct in stating that the few cases which had occurred in Cornwall might clearly be traced to the introduction of cattle from some eastern counties, and might rightly be regarded as isolated instances. It sometimes, however, happened with respect to epizootic diseases, that there was a fulfilment of the old proverb—"it never rains but it pours;" and he could safely verify the fact that some of the disease which had affected our horses, cattle, and sheep of late years, had come, not, as it were, in single drops, but in a complete downpour. This had been particularly the case with the "influenza" in horses, and the "vesicular epizootie," a disease characterised by the formation of vesicles on the tongue, lips, and feet of cattle and sheep. The "variola ovina," or sheep-pox, was another instance. This disease was imported from foreign countries, and wherever it had appeared it had killed its thousands. Fortunately for Cornish farmers, it did not cross the Tamer. He mentioned these cases in order to warn his hearers that, although the murrain known as "pleuro-pneumonia" had not yet visited Cornwall to any great extent, yet it behoved them to be watchful and fearful, for epizootic diseases of all kinds appeared to be borne on the wings of the wind, and it was inpossible to say whence they came or whither they were carried. In those countries in which the disease had prevailed, it had been found extremely difficult to track its course. So uncertain was its appearance, that it frequently broke out without the introduction of strange beasts, or any other assignable cause; and in a few weeks it spread like wild-fire. In such cases the atmosphere was regarded as the medium through which the disease was conveyed. That this disease existed on the continent for several years before its appearance in England, was an undoubted fact; and hence arose the question—How did it reach England? Was it by direct importation of foreign cattle? or was the disease wafted on the air, as had been the case with Asiatic cholera and other similar pests? In every instance of the disease that had come under his own observation, it was clearly traceable to direct importation of cattle from other districts. But, as he had before observed, the malady had been known frequently to break out without any such direct and immediate cause. Thus much of the disease, however, was known—that it had prevailed in England, to a greater or less extent, since 1842; that it had been raging in Ireland for some twelve months before that period; that it was brought to the English side of the channel by some half-starved Irish cattle, and in a very short time it found its way into Cheshire, Shropshire, Staffordshire, and Middlesex; that its ravages had been the most extensive on marshy districts and in ill-ventilated crowded cow-houses; and (a fact well deserving notice) that the wide spread of pleuro-pneumonia was occasioned by persons sending their beasts to markets and fairs on its very first outbreak on their premises. From the peculiar incubating character of the disease, it was obvious that it might be conveyed long distances during its formative stage. This was consistent with the supposition entertained by some medical men, that malignant epidemics are the result of parasites—vegetable or animal—each, after its own kind, disturbing in sundry ways, the functions and the structure of the bodies on which they subsist; and that the germs of disease thus caused may exist for some considerable time before the appearance of its outward symptoms. In pleuro-pneumonia it is supposed that ten or even fourteen days may thus elapse after the period of infection before the disease becomes outwardly apparent. This parasite theory, Mr. Karkeek observed, received some support from the little that was known concerning the properties of parasites: and this was a subject of much practical importance to the farmer. In the first place, such sources of infection were destroyed by a temperature above 120 degrees Fahrenheit, and also by strong chemical agents, especially chlorine. Their activity was also impaired by cold and by free ventilation. On the other hand, warmth, closeness, and filth, increased the virulence of the contagion, and became as it were a nursery of pestilence. Nothing tended to promote the spread of an infectious disease, such as pleuro-pneumonia, more than the crowding together of cattle which were affected by it. Each of those animals was a separate source of contagion, and the air would be contaminated in proportion to their combined action. It might be asked, how the empoisoned air produced its morbid results? He answered—not by direct irritation of the lining membranes of the air passage, but by specific action on the blood; which fluid, thus acted on, did, by its changed condition, virtually, though not immediately, affect the pulmonary tissue. In proof of the assertion that vitiated atmosphere does not act as a direct irritant to the pulmonary tissue, or mucous membrane of the air passages, Mr. Karkeek remarked that the usual symptoms of catarrh or bronchitis are never the precursors of pleuro-pneumonia. And again—if vitiated air acted as a direct irritant of the pulmonary tissue, both lungs would be equally affected; whereas it was well known that the disease was very partial—affecting more frequently the right lung than the left. Hence, pleuro-pneumonia could not be considered as an inflammatory disease, in the strict meaning of the term. It might be asked why this aërial poison affected only the lungs? This was a question not only easily answered. This much was known, that the choleraic poison acted on the intestinal canal, the poison of small-pox re-acts on the skin; that of glanders on the mucous membranes of the nasal cavities, while the poison of pleuro-pneumonia acts on the lungs. He had already stated that pleuro-pneumonia could not be considered an inflammatory disease, in its origin; and of this, the absence of all ordinary symptoms of pneumonia was proof; but there could be no question that inflammation was one of the results of the disease. It was more frequently regarded as a dropsical, than as an inflammatory disease. Evidently the empoisoned air produced considerable debility of the vascular part of the lungs, and serum was effused almost immediately; hence the dropsical character of the disease. As it progressed, inflammatory action was set up, accompanied by congestion, with effusion of lymph and serum into the interlobular structure of the lungs and the cavity of the chest. He was of opinion that this serous effusion took place before the animal's health was observed to fail. Proprietors of cattle should therefore be early and late with their stock, when pleuro-pneumonia prevails in a district, narrowly watching the slightest indication of ill health. The usual symptoms he described were:—A slight, but husky cough would be occasionally observable about this time, and perhaps the breathing would be with increased effect, as if the animal had undergone some unusual exertion. In milch cows, besides the above symptoms, there would be a diminished supply of milk. As the disease advanced, the cough became more troublesome and husky; the respiration became hurried, the pulse increased and oppressed, the appetite diminished, rumination suspended, bowels constipated, and the surface of the body chilly. The disease still advancing, the respiration became more difficult, laboured, and painful; the poor animal was frequently found lying, the head protruded, the mouth covered with frothy saliva, the muzzle cold, rigors frequent, and the pulse rapid and indistinct. Approaching death was shown by moaning, grinding the teeth, loathing of food, coldness of the extremities, wavering pulse, distressed breathing, liquid stools, and distention of the bowels. From this description of this terrible disease, it must be evident that blood-letting could be useful only at its commencement; bleeding should be early, or not at all; at the very beginning of the disease it might do good, but at its later stages bleeding would but hasten its fatal termination, since in proportion to the extent of dropsical effusion would be the debility of the patient. It was supposed by Mr. Simonds, of the Royal Veterinary College, that early bleeding might withdraw a portion of the vitiated fluid that had laid the foundation of the disease. Another remedy frequently adopted was the use of purgative medicines. In most diseases affecting the ox tribes, it was found that gentle aperients were beneficial; but in pleuro-pneumonia, strong purging should be avoided. Diuretic medicines might be useful, as in dropsical diseases, for stimulating the kidneys to increased action. He had little faith in sedative medicines or diaphoretics in this disease; but diffusible stimulants and tonics were valuable remedies, at the commencement of the disease, after the operation by purgatives. In the latter stages of the disease, vegetable and mineral tonics would be found useful. A veterinary friend had used creosote with considerable success; he (Mr. Karkeek) could be disposed to try its effect when opportunity offered. After speaking of the necessity of occasional relaxation of the bowels, in connexion with the use of the above medicines, Mr. Karkeek further recommended the application of a seton to the "*dew-lap*," and of blisters to both sides of the chest. In conclusion Mr. Karkeek remarked that there should be no specific for this disease; and that he who should undertake its treatment without a knowledge of its nature, and of the structure and functions of the organ it affects, would act like an ordinary artisan who should set about the repairing of a watch, the wheels and levers of which he had never investigated. Inattention to contagious diseases had occasioned much mischief and loss of property; and there could be no doubt that, if proper precautions were taken on the first appearance of pleuro-pneumonia in any neighbourhood, its ravages might be considerably mitigated. On the outbreak of a disease of this kind on a farm, the first thing to be attended to is the removal of the infected beasts to some suitable place far from the other cattle, where they can be watched and receive medical aid, without endangering the healthy animals; and these too should be carefully inspected daily. Finally, he would impress upon his hearers the strong necessity for judicious feeding, proper drainage, ventilation, and cleanliness generally, as rendering cattle impregnable, to some extent, against-infectious diseases. A striking proof of this was exhibited in the well-known fact that the high-bred cattle generally of England had been comparatively exempt from pleuro-pneumonia; the obvious reason being that more attention was paid to their health and general comfort than was paid to ordinary cattle.

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE CULTIVATION, STORING, AND USES OF MANGEL WURZEL.

The usual monthly meeting of the Club was held on Monday evening, March 1st, at the Club-house, Blackfriars.

In the unavoidable absence of Mr. Owen, the Chairman for the year, Mr. Henry Trethewy, of Silsoe, Beds., took the chair, supported by Messrs. Owen Wallis, William Bennett, T. E. Pawlett, L. A. Coussmaker, J. Tyler, James Thomas, W. Gray, S. Skelton, W. Shaw (Coton), J. Wood (Sussex), J. Wood (Croydon), J. Cressingham, H. Gibbons, G. S. Harrison, Ibbott Mason, J. A. Clarke, J. Ekin, Hammond, W. Eve, R. Peacey, W. Banwell, C. J. Brickwell, W. P. Lamb, E Purser, G. Wilsher, J. A. Williams, J. Miles (Wexcombe), T. Stagg, T. Chandler, J. B. Spearing, S. W. Squier, J. Odams, &c., &c.

The subject fixed for discussion, at the instance of Mr. R. BAKER, of Writtle, was stated in the following terms:—"The cultivation and storing of mangel wurzel, and the best modes of using it for feeding and other purposes." Mr. Baker brought with him from his farm a number of specimens of the root in question, that he referred to, several times in the course of his introduction, and which were generally admired for their development and freedom from prevalent defects.

The CHAIRMAN, in opening the proceedings, remarked on the importance of the cultivation of mangel wurzel, and observed that the feeling of the committee on the subject was shown by the fact that roots were set down for discussion, in one form or other, no less than three times during the present year.

Mr. BAKER said: Of all our root crops the most important is mangold wurtzel, of which we may say, as its name imports, that it is "the root of scarcity;" in other words, it is the root to be depended upon during a scarcity of other food, and, with the exception of the Swedish turnip, there is undoubtedly no other description of root either so serviceable or productive, whilst in many particulars it is far superior even to that. In combination with the swede, in feeding, it fills a place which that root has failed to supply, and it is especially adapted for feeding late in the spring, after the turnip has lost most of its nutritious qualities. It is also more certain to plant well. It is less liable to injury from excess of drought or moisture. It can be stored during the autumn with less injury to the land than follows the removal of a turnip crop during the winter months, and under the improved system of management can be applied to the feeding of neat stock and sheep throughout the whole of the year. Independent of these numerous advantages, it is also more productive than any other description of root; it can be grown with advantage upon almost every description of soil, especially strong loam or clay—totally unfit for turnip cultivation—and during the winter, when severe frost prevails and turnips become almost useless, it can be used with equal advantage as at other seasons, provided due care is taken in storing to keep it from the action of the frost, from which, like the potato, it is liable to become injured, and even rendered useless, should it happen to become entirely frozen Within the last five years both the Swedish and common turnips have deteriorated to such an extent as to have become (upon soils on which they had been repeatedly grown for several years in the ordinary rotation) almost useless. In addition to the disease called "fingers and toes," which has of late been very prevalent, another disease has appeared, in a certain degree similar in its effects to that which has proved so destructive to the potato, and which in the present season especially has rendered the turnip-crop almost worthless throughout the kingdom. At the same time, however, mangold-wurtzel has produced a crop unprecedented for weight and quality; nor does it deteriorate like the turnip, by being grown upon the same soil for many years successively, as instances can be adduced where it has been grown on the same land for many years together, without in any way becoming depreciated in quality or quantity, but has rather improved year by year the longer it has been grown (Hear, hear). The application of guano and superphosphate of lime to the turnip-crop is equally effective for mangold-wurtzel, and affords the cultivators of strong clay soils an opportunity of growing it at a reduction of expense previously unknown, and with an advantage that can scarcely be sufficiently estimated. It is, however, best adapted for, and is most generally grown upon, tender and strong loamy soils, as the difficulty which sometimes arises in wet seasons of carting the roots from the field renders the removing them from strong tenacious clays a hazardous process at all times, and in some seasons impossible to be effected unless by employing men to carry them to the sides or the fields in baskets, which cannot be accomplished at a less expense than from 20s. to 25s. per acre. This valuable root has been grown successfully in Essex within my knowledge upwards of 40 years. The long red variety was at first the only one cultivated; the globe varieties of both red and orange were subsequently introduced, and at a later period the long orange. Little improvement has taken place by cultivation in the long red variety; indeed, I consider that it was as good, if not better, 30 years ago, than at the present period. Great care, however, was then taken to select it for seed whilst growing, and ultimately to change it from a heavy to a light soil, as it has always a tendency to become too fine and slender in the form of the root if grown successively upon light soils, too thick and short upon heavy soils, and in a few years, unless properly changed, it would degenerate alike in the form, character, and colour of the roots, upon which the quality and productiveness of the crop greatly depend. The crown of the root should not rise in any material degree from the base. The foot-stalks of the leaves should partake of the colour of the root, a light red, and not be too many in number, but branching gracefully from the base. There should also be a similarity in all the roots, which in their form ought to be nearly alike, ending below in a single tapering tap-root of small dimensions, without any fangs branching from them, to prevent their being easily drawn from the soil, without the assistance of an implement to effect it, but yielding at once easily on the slightest application of force being made. This desideratum cannot be obtained when the seed has been grown from small plants raised in the previous autumn, but only by carefully *selecting* the *roots* one by one from the field whilst growing, and rejecting those which when pulled have not the requisite qualifications of colour and shape, especially at the crown and root. The difference in the cost of producing seed from roots thus selected, and from plants as before stated, varies from 300 to 400 per cent. Seed from plants is apt to run off with a seed-stem in the first year, whilst that produced from full-grown roots is less likely to do so. Planting very early likewise produces the same tendency, and it is in a general way not advisable to plant before the middle of April nor after the middle of May. The system of cultivation as carried out by myself is to plough up the land intended for this crop immediately after the previous grain-crop has been removed. The land best adapted for the purpose is that upon which wheat has succeeded clover. The land in the first instance ought not to be ploughed beyond the ordinary depth, until, by repeatedly scarifying and harrowing, the couch and root weeds become extirpated. About the middle of October the soil should be stirred an extra depth, which can be easily effected by the ordinary plough, followed immediately by a skeleton-plough or grubber, furrow by furrow, until the whole is stirred from ten to twelve inches in depth. Ridges should then be formed two feet eight inches wide, in the contrary direction of the field, and a grubber be passed up each of the furrows the full depth of the ploughing. If opportunity will allow, the ridges may be re-ploughed, and the operation of grubbing the furrows repeated as before. This process may, however, be thought too expensive, but the improvement of the mangold wurtzel and succeeding grain crops will become too apparent to leave any doubt as to its beneficial application, and it will be found to answer far better than if the dead subsoil had, by an excessively deep ploughing, been brought up by one operation only to the surface. If farmyard manure is to be applied, it should be first moderately decomposed by fermentation, and carted on at any time in the winter or spring, when it can be accomplished with least injury to the tillage of the soil. As soon after it has been spread, the artificial manure should be sown by hand upon it in each furrow, and immediately ploughed in, taking care not to make the attempt unless the weather and state of the soil are both suitable, and never venturing to bestow the artificial manure unless it can be directly ploughed over. The land should then be suffered to remain until the time of drilling or dibbling in the seed; by no means, if possible, stirring it near that time, so as to allow the moisture to evaporate. It is by adhering strictly to this principle that a plant can with certainty be secured; whilst, on the contrary, by continuously stirring the soil until late in the spring up to the time of sowing, it will probably be lost, unless frequent showers happen to fall at that period. Upon the strong clay homogeneous lands of Essex, which can scarcely be exceeded in tenacity, very fine crops of this valuable root are produced. The practice pursued is, soon after the wheat crop is cleared, to plough in deeply, by one ploughing, about 20 cart loads, 36 bushels each, of good farmyard manure; the long dung, direct from the yard, being preferred. The land then remains untouched until the month of April, when it is scarified and harrowed (not again ploughed), and the seed is drilled in three rows, upon stetches of 6 feet 6 inches each in width; and under this simple mode as fine crops as I have ever seen are produced. The wheat eddish selected for the purpose is, as before stated, where clover had been taken in the previous year, and the after-cultivation of the land is principally carried on by the horse-hoe. The difficulty, however, in carting off the crop in wet seasons is very great upon such soils, and various modes of removing it have been resorted to, sometimes by panniers and horses; but the cheapest mode is by carrying it off in baskets, which it is stated can be accomplished for one shilling per ton, when stored at the sides and ends of the field, and sometimes in a continuous row also in the middle, it can be afterwards removed during a frost, or as best can be effected when opportunity offers for employing the teams to advantage. Although it is at all times necessary to produce a fine tilth at the surface, a considerable degree of firmness is requisite to ensure a full crop. To fully effect this object the land ought to be rolled down with a roller sufficiently heavy to consolidate the soil without kneading it, but this ought not to be attempted until it has become sufficiently dry to accomplish the work safely. If, on the other hand, the weather continues moist, the rolling will be best effected by a roller of a lighter description, such an one as is used for turnips being sufficient. Planting is best performed by the drill, taking care that the seed is never deposited more than one inch in depth. If the land is in a very moist state at the time, and the weather showery, it is better to leave it untouched, after depositing the seed by either harrows or drill. A light bush-harrow may, however, under such circumstances, be adopted. If the weather is dry and the surface of the land also, an extra rolling should then be given immediately after the seed is deposited, which by some cultivators is previously soaked from 24 to 36 hours. This is, notwithstanding, at all times a hazardous practice; for if the land is moist, the soaking of the seed will not be of any advantage; and if nearly dry, the moisture remaining not being sufficient to facilitate vegetation the seed will be likely to rot or mould, and fail in vegetating. Again, if the seed be new, which is the main object to secure success, little doubt can exist that success will follow; for although seed will continue to vegetate until three or four years old, it never does so freely, unless a superabundance of moisture is already present, and the weather continues mild and showery. The process of dibbling is so simple as hardly to require description. The dibbler proceeds with a wooden dibble, having a rather blunt point, and turned with a shoulder, to prevent its entering the soil more than one inch. From two to four seeds are deposited in each hole, and afterwards covered in by the dibbler himself, or by a boy following, who with the back of a hoe punches in the soil firmly on the seed. This, however, may be varied, by the man proceeding with the hoe, and removing a little of the soil, by drawing it with the blade of the hoe towards himself; a boy on the opposite side of the row drops the seeds on the space from which the mould has been withdrawn. The man then immediately pushes the mould back over the seed, and gently presses it down; and as each capsule contains from two or three seeds, they by this process become more dispersed than when dropped into a small hole, and can be more easily singled out afterwards. From 3 to 4 lbs. of seed per acre is found to be sufficient, provided, as before stated, the whole of the seeds are of the previous year's growth; which is however very rarely the case, unless the seed is purchased of persons upon whom dependence can be placed. It is also frequently spoiled by mice extracting the seeds, with but apparent little injury to the capsule, and which inexperienced persons would not be likely to detect. I am induced to draw particular attention to these facts, as I believe that the causes of failure depend mainly upon defective seed being used; and I do not recollect a single instance in which I have failed in obtaining a plant when I knew that the seed was new and had been well preserved, which, if perfectly dry, may be done by keeping it in casks, or suspending it in sacks from the roof of a building. If a quantity of seed, however, is left exposed in granaries infested by mice, in a few weeks they will extract every kerne from its outer case. The distance at which I plant my roots is 15 inches apart in the rows, and 22 inches apart from row to row. As I now use my roots as early as the month of August, I, for that purpose, have them left about ten inches apart, and by withdrawing each root alternately but little loss ensues to the main crop. This is a far better practice than that of removing part of the leaves, which is very injurious to the after-growth. By the middle of August in the last year, I was enabled thus to obtain from 12 to 15 tons per acre of roots and leaves together, without any material loss in the crop. As soon as the young plants appear, which in favourable seasons takes place in a few days, they should be inspected; and if it is apparent that they decrease, the land ought to be again rolled. The wireworm is sometimes very destructive, especially when land in the previous autumn was covered with grasses; and if seedling weeds are found to spring up abundantly, the ground ought to be at once carefully hoed, and the weeds eradicated from the close vicinity of the plants; for if they become once choked by weeds at this season of their growth, they rarely recover the check thus received. As soon as the plant arrives to three or four inches in height, they should be singled out by hand, taking care to secure the best plant first in the left hand, and then to pull out the superfluous ones with the right; but, if drilled, the plants should be set out first with the hoe, and afterwards singled by the hand, as in the former instance. After the plants have been singled out and the tops of the ridges carefully hoed, a horse-hoeing should follow, which, from the land having been previously subsoiled, will be easily effected; but, if the land has again become consolidated in the furrows, another process of grubbing, or subsoiling, should take place, to enable the horse-hoe to enter the soil readily. Subsequent hand and horse hoeings will also become necessary, and should be frequently applied; and, as the plants advance in growth, the hand-hoeing should be so managed as to draw the soil *from* the roots towards the furrow, so that at the expiration of the season the land will have become nearly level. Great care should be taken to have every plant standing singly, and at all times kept perfectly clear from weeds. All plants that run up with a seed-stem ought to be instantly pulled up and conveyed to the live stock, as they never afterwards form a good root, but greatly impede the growth of those that stand nearest them. The manure best adapted is guano and superphosphate of lime combined; an admixture is invariably found to answer best. This root is a gross feeder, and can hardly be supplied too abundantly with manure; so that, after the land has been properly prepared, it becomes a matter of calculation to what extent manure can be applied, to afford the greatest return of profit in the ensuing crop. As this plant is of marine origin, salt is necessary to its full development. I have generally applied the salt at the time of subsoiling, between the ploughing that precedes and the second ploughing that follows, so as always to bring the subsoil into immediate contact with it; from two to four cwt. per acre is sufficient. I have used the latter, but have lately found that a repetition of that quantity within two or three years is too much, two cwt. being afterwards quite sufficient for the succeeding dressings. I usually apply from 8 to 10 tons of good, partially decomposed farm-yard manure, upon which, when deposited in the rills, I broadcast four cwt. per acre of rapecake, pulverised and mixed with two cwt. of guano and one of superphosphate. If the land is not very good, I add another cwt. of guano or artificial manure. At the time of drilling-in the seed I drill-in one cwt. of superphosphate of lime with it, to force a quick growth of the plants in the first instance. By this mode I usually obtain a good crop, and in using any substitute for the rapecake or farmyard-manure adopt some sort of artificial manure containing a large amount of animal matter. By increasing any of these substance. I feel convinced, from practice, that a larger quantity than three cwt. of guano cannot be applied with advantage; equal to adding, in point of expense, an equal value of some other description of animalized manure. Fish and blood manure are both well adapted, and near the sea-coast, wherever fish can be procured, it may be applied in preference to any other description. Thousands of bushels of star-fish and sprats are annually used for this purpose, which are purchased at about 6d. per bushel, and, in point of cheapness, surpass most descriptions of artificial manure. It is usual to plough them in preceding the winter, merely scarifying the surface afterwards at the time of sowing. During its growth it is seldom interfered with by insects. Slugs and wireworms attack it in its early stages of growth, as well as the common turnip-fly; but the latter only injures it to a certain extent. By sowing early, however, it sometimes becomes greatly injured by frost, and is sometimes killed if the frost is more than usually severe. Besides, as before mentioned, it has a disposition to run to seed, which induces me to suggest that about the middle of April is the proper time for sowing the main crop. Much, however, of a successful result depends upon the weather that follows, and a due preparation of the land previously. Hot and dry summers especially promote its growth. It rarely suffers from drought; whilst on the other hand excess of moisture and a low temperature combined retards it greatly, and the quality becomes also depreciated in like proportion. After the crop has arrived at maturity it is carted from the field to the homestead, or is stored near to the spot on which it has grown, as the farm-horses are in greater request at this season than at any other portion of the year. It is usual to secure it as near the field as possible, keeping in view the contiguity of a good road, as necessary for its after-conveyance to the homestead. Having determined this point, it is usual about the middle of October to commence pulling and storing it. The roots are pulled up, and the leaves merely twisted off. The former are thrown at once into carts, and removed to their destination. The usual price is 8s. per acre, inclusive of unloading the roots and packing them. The drivers are found by the owner. This amounts to about 4d. per ton, but the price paid depends in some measure upon the state of the weather, the weight of the crop, and the quality of the roots; for if of a bad sort, they will require to be grubbed up by some implement, in which case the cost might be doubled or even more. It is advisable to commence stacking the roots upon a base not exceeding three yards in width, but from 6 to 7 feet is better. The roots should be packed with the crowns outward, in the form of a roof, diminishing upwards until they arrive at a narrow ridge at top, rising from the base from 6 to 8 feet in height. If a wider base is selected it will be necessary to introduce a fagot upright in the middle of the heap at about every 6 feet apart, so as to carry off the heat; for should fermentation set in, which in some seasons it is apt to do, unless due precaution is taken to prevent it, the result would be to spoil the roots. When the clamp or row is completed, it should be well covered over with straw, about 6 inches in thickness, and then with the soil dug up immediately around to the thickness of about 8 inches, leaving an opening over each fagot secured at first partially from frost by a wisp of straw only. It is, however, thought advisable by some cultivators to defer earthing the heaps to the top for about 2 feet downwards, until a later period, and all hazard of fermentation is over. When it is stored in a building made secure from frost for the purpose, but little further care is necessary, as I have never known an instance of its being injured by fermentation, provided the top of the heap on remain uncovered. In my storing house I frequently cart in from 400 to 500 tons in one heap of 20 feet in width. The walls are formed of the earth excavated; a roof with a thick coating of thatch covers the whole, and the carts enter by folding doors at one end. It may be safely packed to any thickness and height, if afterwards protected only with straw. For this purpose barley straw answers best, and is packed round about three feet wide, and well trodden down, and afterwards thatched over down to the surface. In pulling the roots preparatory to removal it is necessary to take due precaution against injury arising to them by the action of frost, a very slight degree of which will, if they are exposed after being removed from the soil, cause them to rot. That portion of the root which has previously grown beneath the surface being extremely liable to injury when exposed above it, the better way is to pull and carry them direct from the field to the store, and there will be no necessity to remove the soil from the roots further than it can be effected easily, as it readily parts from the roots after storing, whilst by remaining upon them it tends to keep them from fermentation, which however never injures them if the heat is not confined in the heap by the earth applied as a protection from frost. This root is peculiarly adapted to heavy and moory land. It will also flourish upon all loamy soils, upon which Swede turnips succeed well. In most cases it will produce from 18 to 22 tons per acre, but with extra cultivation and management about 10 tons per acre more. The quantity per acre can be easily ascertained by weighing one load carried by each cart employed; and by filling the carts alike the quantity may be obtained. Measuring a single rod, and computing the weight per acre by it, at all times is a fallacious mode. Great errors are sometimes made by it, as much as 25 per cent. less having been afterwards detected by computing by this method. A row taken and weighed from two or three average portions of the field would give a result sufficiently near. The weighing of a single rod to ascertain the comparative *weights* of different varieties is, however, the best mode; as the quantity in imperial stones per rod is equivalent to the like number of tons per statute acre of 160 rods. There being 160 stones in one ton, this mode is exceedingly well adapted to obtain the weight of the produce per acre. The weights per rod grown by myself in last season were as follows:—

		cwt.	lb.
Red globe......	strong loam, weighed	4	32
Long red	ditto	3	96
Yellow globe....	ditto	3	90

Upon tender loam the yellow globe produced 4 cwt. 4 lb., the other varieties not being weighed. In every other instance of weighing in previous years, the long red variety was invariably the heaviest. It has also other advantages, being more easily pulled and stored. The quality I consider about equal. Cattle, however, will select it from the orange-coloured in preference, and hares and rabbits also. Some of my land at one time joined a game preserve, and I then found that during the early growth the orange varieties were not much bitten, but that the long red, on the contrary, were always very much injured. Having described the mode of producing, I shall now advert to the best mode of expending this root, so far as my own observation and experience enables me, and having now used it forty years, I have no hesitation in giving it the preference to every other description of root or vegetable, not only as regards the amount of produce, but as to its general applicability. For fattening neat stock it is superior to the turnip. For breeding sheep and cows, however, I think the latter better; but as the season advances, the mangold wurtzel becomes greatly superior, improving the longer it is kept in the spring, whilst turnips depreciate in about equal ratio. Where cattle have been accustomed to it early, they never become affected by it afterwards; but it frequently happens that other neat stock and sheep, upon having their fill, at once become affected. It apparently attacks the nervous system, and produces stiffness of the joints, and they refuse to eat it for a few days; but all this may be obviated by feeding them moderately upon it at first, increasing the quantity daily, and always combining it with cut chaff or other dry food. I introduced this mode on a former occasion to the notice of this club, and have since found it has been generally adopted. The mangold root, when first drawn, contains an abundance of water, and requires dry food in admixture to counteract its effects upon the bowels of the animals. It can be also adjusted better as regards the quantity given per day; from 56 to 112 lbs. being fully sufficient. About the middle of January the second vegetation commences, and the sugar it contains becomes fixed, and cannot be extracted. From that period, the fattening properties become greatly augmented, and continue to increase until the month of June. I use machines that pluck it into small pieces; these are mixed with a quantity of cut chaff, composed one-third part of hay and two-thirds oat or wheat straw, moistened by linseed meal, that has been steeped in water forty-eight hours, at the rate of 3 lbs. to each bullock. In addition, from 3 to 4 lbs. of barley or bean meal are added at the time of feeding; each meal being prepared twelve hours previous to using. For store stock about 56 lbs. (equivalent to one bushel) is given; for fatting stock from 80 to 112 lbs. per diem. I keep a large number of milking cows, which are fed upon it from August to June following. Whenever the leaves can be used we find an increased quantity of milk. They are invariably cut up, and mixed with the roots and chaff, and are the most valuable portion of the plant in its early stages. As a manure, when ploughed in, they are also beneficial; but where much live stock is kept they can be applied to a more beneficial purpose. In feeding sheep, as well as cows, the roots are best when combined with cabbages or turnips, but should never be given to either without some degree of caution being exercised, as a sudden change of food is apt to cause considerable relaxation of the bowels, which can be mostly avoided by proper management. For sheep before lambing and for sows in farrow they cannot be recommended, and for very young pigs they are also not well adapted, but are even injurious. The roots produce great heat in the system, and even oxen will during the most severe frosty weather be found in a high state of perspiration in open yards, and young cattle invariably fatten upon them far better in open yards than when stalled. This may be accepted as an established fact, having myself made several experiments to prove it. With older cattle it is otherwise. There is one point, however, quite certain, that cattle which have been longest accustomed to mangel wurzel thrive best upon it, and for youn weaned calves of two or three months old it succeeds admirably; still, whenever it can be combined with swedes or common turnips, it is advisable to do so. I may appear prolix in these descriptions, and to the experienced farmer much will appear to be a repetition only of his previously acquired information; but from the number of inquiries I from time to time receive upon the mode of cultivation and application, I am induced to believe that the public in general are not acquainted with either. Indeed, in many districts it has not yet been introduced, whilst in many others only recently, and but in few has it been extensively brought into cultivation. The yield per acre will depend in a great measure upon the means employed, the increase being for the most part dependent upon the state of the soil and the quantity of manure applied. It must, however, be obvious that, after the land has been brought into the necessary state of tillage, the next question is to what extent manure may be applied best to facilitate the object. It becomes merely a calculation whether an extra ton of manure will or will not produce a corresponding return in weight of roots. So far as my experience has been confirmed I have found that by an extra application of 1 cwt. of guano, of the cost of 14s., from 4 to 5 tons increase of roots may be produced, and so of most other descriptions of manure in like proportion. Some curious particulars respecting it a few years since were accidentally obtained. At a sugar manufactory established in Essex it was found that the sugar could not be extracted after the second vegetative process had commenced in the root. This circumstance to some extent explains why the roots at this particular period are of a less laxative quality and greater fattening property. Mangel wurzel contains about 5 per cent. of sugar which has been extracted and manufactured profitably by the French for a long period of time, but recent attempts made in this country have not been attended with like successful results. The Silesian beet has been used more especially, but it is a question, taking weight into consideration, whether it would be more profitable for that purpose than our orange-coloured mangold. Some years ago, observing it in process of drying upon a kiln devoted to the purpose of drying chicory, and doubtless as a substitute for that root, it struck me that in this state it would produce good beer, the dried root acquiring a malt taste, and the moisture of the root being driven off by the process of drying. I made various experiments, and have produced a good beverage, very similar in colour and character to London porter; but I am free to confess that the workmen in my employment, having acquired a peculiar *relish* for malt beer (Hear, hear), cannot be induced to accede to its adoption at seasons when they assume the dictatorial position, especially during harvest (loud laughter). The process, however, is so simple, that I will repeat it here, and offer you a sample whereby you will be able to judge of its quality. The roots should be sliced with a Gardner's, or other turnip slicer, about three-quarters of an inch in thickness and about one and-a-half inches in width. These should be dried slowly upon a kiln, until quite crisp, taking care not to scorch them during the process. Three bushels of these dried roots are about equivalent to one bushel of malt, and should when placed in the mash tub have boiling water poured upon them, so that when drawn off it shall produce one hogshead of sixty gallons. This liquor should be boiled from one hour to one-and-a-half hour. Then add hops equivalent to 3 lbs. for each hogshead, and boil 15 or 20 minutes longer; ferment the wort at 65 to 70 degrees, and treat it exactly as in the case of malt liquor. Keep it at least eight months before using; but at 12 months it will be quite ready for use, and will then keep 12 months longer with advantage. Nine bushels of the roots will be equal to three bushels of malt, and sufficient for one hogshead. The roots will not be much deteriorated by the process of brewing, cattle eating them with greater relish than before. The cost per hogshead will be about 10s., or sufficient of the roots may be cut into pieces and put into a copper until full. As much water may then be added as the copper will hold. When it has boiled long enough for the roots to become tender, the liquor should be strained off, and sufficient hops added, and again boiled one hour. Ferment and turn as before. Although this plan is attended with less trouble, the former is far preferable, as the process of drying drives off the watery portion of the root, by which an earthy flavour is got rid of, and, the root becoming malted, assumes the flavour and quality of malt produced from barley. Every one who has the slightest acquaintance with the science of chemistry must be aware that any substance that contains sugar will produce fermented liquor, as beer, which upon distillation will yield alcohol or spirit. Sugar, however, being presented to us in the form it has acquired by the processes of manufacture, is scarcely reconcilable with the opinion entertained of mangold wurtzel by the majority; and it is very probable that the sap or juice extracted from the sugar-cane differs in its first stage but little from that extracted from mangold wurtzel. Be this as it may, prejudice can rarely be overcome, with the lower classes, in any matters connected with their food and drink, however great an improvement may take place (Hear, hear, and a laugh). To those who may wish to grow their own seed, it will be only necessary to state that, after the roots have been properly selected, they should be protected from the action of frost until the following March, when they should be planted out about 18 inches apart, protecting the upper portion of the root from after-frost by coal-ashes. The shoots, as they advance, should be supported by stakes, and carefully preserved from the attacks of small birds, especially sparrows, which will, if seed is attempted to be grown on a small scale, most probably destroy the crop altogether. In concluding, I beg to observe that I have adhered throughout to the broad principles of cultivation, as carried out by myself, leaving to others particular systems for discussion; and I have avoided throughout introducing anything but what has resulted from my own practical observations. Since I completed my paper, I have received a communication from a correspondent (Mr. Stagg, of Grafton, Wilts), who has grown and used this root largely. He states that he believes it was not at one time much appreciated; but that the prejudice is wearing fast away, since the application of it has become better understood. He states that danger from overfeeding must be avoided; that the root should be treated rather as an auxiliary in feeding than otherwise; and that 56lb. per day for store cattle and 70lb. for fatting cattle is sufficient; that in feeding ewes he does not allow them more at once than they will eat in three-quarters of an hour. For lambs and tegs, he thinks about two bushels of cut root per score sufficient for one day, increasing the quantity to three bushels per score, and, as the spring advances, even more; and he then, in adverting to its feeding quality, states that its nutritious property consists of saccharine, which he erroneously supposes to decrease as the season advances, because it cannot then be extracted for making sugar. Upon investigation, however, such does not appear to be the case. The sugar undoubtedly remains, but becomes fixed, so as not to be extracted by the usual modes. It ceases to crystallize under the ordinary process; but that it remains un-diminished in quantity, is certain. The root, during the spring, loses a large proportion of moisture. The quality becomes sensibly altered, and the sugar has also undergone a chemical change, which causes it to act upon the intestines of the animal less violently than in its early stages, and which, as I before stated, may be altogether avoided by combining it with dry food, and giving it in moderate quantity. Cattle, however, that have been fed upon it from an early age, are never observed to become afterwards affected by it. Some discussion has taken place upon its being injurious to sows in farrow, and to very young pigs, which, although not invariably the case, ought to be obviated. I prevent it as much as possible by sending them away to a yard where it cannot be obtained, but for pigs from four to twelve months old it is highly beneficial. I also object to giving it to the ewes in lamb, as I have sometimes found that it has been attended with bad results, and, as a general rule, ought to be avoided; but wherever it can be combined with other descriptions of roots or cabbages it is excellent. Horses can be fed upon it with advantage, and in small quantities daily it may always be successfully used. By a statement I received from an intimate friend, the result of such a mode is given by him as follows. The horses I inspected, and they certainly appeared in healthy and good working condition. Expense of keeping 8 horses for 18 weeks at, per week, £2 6s. 8d. 2½ bushels each horse per day at 4d. (the exact cost per bushel), or 5s. 10d. each horse per week. One and-a-half bushel when at light work, 4s. per day, £1 8s. per week, or on an average £1 17s. 4d. per week. The roots were given whole, and the horses had sufficiency of good oat straw in addition, which, at 1s. 6d. each, is 12s.; altogether £2 9s. 4d. per week. Eight other horses, at one and-a-half bushels of oats each horse per week, is 12 bushels, at 3s., £1 16s.; half ton of trussed hay in addition, £1 10s.; average per week £3 6s.; so that the keep in one instance was £2 9s. 4d. per week, in the other £3 6s.—in my opinion, not sufficient profit to enable it to be adopted, especially upon farms principally arable, where the manufacture of manure is of great consideration. Six oxen might have been maintained in addition to the horses, which would have produced double the quantity of manure, a point worthy of consideration as an adjunct. However, in feeding horses, not exceeding 1 bushel per week to every horse becomes beneficial in the highest degree to the health of the animals. In conclusion, I wish to add, that upon a fair calculation, mangold wurtsel is a crop that may be produced more cheaply than swede turnips, or any other description of cattle food. Upon our light turnip soils it cannot be introduced with advantage, nor will it ever in such situations be accepted as a substitute for either the swede or common turnip, especially as it cannot be folded off by sheep upon the field where it has been grown; but for yard feeding of sheep I believe it to be superior to the varieties of turnip. Upon mixed soils and strong clays, too heavy for the cultivation of the turnip, it has opened a new system of cultivation, enabling the occupiers of farms, upon which 30 years ago no cattle food was obtained in the winter, to fodder out their straw and hay with great advantage; and since the introduction of guano and artificial manures it may be grown almost to any extent without depriving the farm of the ordinary manure. In the autumn, from the beginning of October, the pulling and storing the crop may be commenced whenever the leaves may be required, pulling the roots no faster than they may be required. So far as my experience goes, I believe they may be estimated at from 30s. to 2*l.* per acre. My mode is to cut them with hay, and the short straw coming from the thrashing-machine at that time. Large store hogs, with a moderate quantity of peas or beans may be fattened to a certain extent upon the roots, so as not to require much meal in addition afterwards; but the meat will not be of first rate quality if no meal is used in addition. One word I wish to add upon the cultivation. The land cannot be too frequently stirred, even if weeds are absent; but in hoeing, if the roots are cut with the hoe from inattention, it always injures them, and frequently spoils them altogether. Another very important point is the quality of the roots, and which cannot be obtained unless the seed has been well and carefully produced. Cheapness is the order of the day, but in no instance does a farmer pay more dearly than when he purchases seeds of indifferent quality; but in seeds from which our roots are produced, which at most amount to only a few shillings per acre, the crop has varied from 100 to 300 per cent.; whilst invariably the soil is injured to a far greater extent by the worst variety. Wheat appears to be the best crop to succeed, if the land can be cleared with little injury. It will require, however, a light dressing of manure at the time of sowing, or a top-dressing in the spring of 40 bushels of soot per acre, if it can be procured, to be applied when the weather is open and moist, early in the spring. The broad leaf, or red clover, succeeds better after it than after any other crop; and I have known instances of wheat and mangold-wurtsel being grown in rotation for many years together, and probably with as large profitable return as by any other system of husbandry. By way of addendum, I will give the cost of brewing beer from it exactly as carried out by myself, for the instruction of those who are desirous of making the experiment. Although brewing from mangold-wurtsel has been referred to in the foregoing description, I may observe that beer made from Silesian beet is far preferable, and more nearly imitates beer manufactured from malt, and is not so liable to become flat after the cask becomes partially drawn out, or exposure to the air takes place, to which beer from mangold-wurtsel is liable. Five tons of roots produce from 70 to 80 bushels of dried roots, and are calculated to brew as much beer as 4 quarters of barley-malt. A copper that holds 1¼ hogsheads will require about one-third more water to obtain sufficient wort to again fill it. Put 1 hogshead at boiling-heat upon the roots, and mash well; then, as quickly as it can be obtained, add 1 hogshead more boiling water, to be again mashed; let it stand one hour additional, and draw off clear; put on about 1 hogshead of water cold, and in about a quarter of an hour draw off. This liquor should be put in the copper, and boiled for the next mash; take out the roots, and replace with a like quantity as before for the second brewing; boil the wort for one hour, then add 5 lbs. of good hops, and boil twenty minutes longer; ferment at from 65 to 70 degrees, as with malt-beer; tun, and keep it eight months before using: it will, however, keep two years, and continue to improve, from 6 to 8 bushels of the roots being sufficient for each hogshead. The roots may, after being used for brewing, be given to cattle or swine, with but little loss in quantity, but certainly of improved quality. One ton of roots produces about 15 bushels of dried roots; the cost of drying being 5s., and slicing about 2s. more; the whole cost of the beer is 10s. per hogshead.

Mr. W. BENNETT (Cambridge) regarded the subject, however, of how best to grow, to store, and to use mangel wurzel, as of paramount importance, more especially at the present day, when in many parts of the kingdom Swedish turnips had become almost an utter failure. This root had long become the staple article for the fattening of cattle in almost all parts of the country, but had of late years become subject almost to endless diseases. He could speak particularly of his native county (Bedfordshire), Herts, Hunts, and Cambridgeshire. The crop of swedes was not only now blasted, by a great variety of insects, by the very frequent occurrence of the disease called an-berry, or the finger-and toe disease, but also by a complaint similar to the potato murrain; the bulb decaying most near the root, and at other times it would commence at the very heart of the turnip. Nor was the disease at all confined to certain unkind lands for turnips, but on the best convertible soils, and those under the very best management. Our farmers could no longer depend upon any part of these crops to draw off for stall feeding; but sufficient could not be grown even to furnish manure for the succeeding crop of barley, where all the turnips were fed upon the land. It was that circumstance which rendered Mr. Baker's able paper so much the more valuable, for it was a startling fact that while they had rarely known a more wretched crop of turnips, the mangold had proved this year splendid almost beyond precedent. Mr. Baker's remarks on the culture for mangold were very judicious: his practice in some respects was very similar to his (Mr. Bennett's). His own plan was to plough deep in the autumn, often two furrows deep, or plough one good deep furrow, the subsoil-plough following; but where the subsoil was at all strong and good, he preferred ploughing two furrows deep, throwing the lower soil at top, for the action of the atmosphere. For his own part he preferred getting the land ultimately into Northumberland ridges, although he knew on the strong lands of Essex and part of Suffolk our best farmers succeeded in growing admirable crops on the flat surface, by one deep autumnal ploughing (cheers). The great superiority of mangel wurzel over most other roots was, first, that it might be grown on land unkind for the growth of turnips; secondly, such lands would bear a much heavier crop; thirdly, it was far more easily extracted from the soil; fourthly, it might be kept much later in the season; and last, though not least, if fed judiciously with other food, it was equal if not superior in its fattening qualities to the best kind of turnips (Hear, hear). The cultivation of mangold had in fact opened a new era in clay land farming. There were many farms in his native county, on the northern side of it, where decent flocks of sheep were kept in summer; but not being at all adapted for turnips, the flock had to be disposed of, in the winter, except a few half-starved ewes, which ran over the grass land in the day time, and browsed the bean-straw at night. By the cultivation of mangold, however, in these modern times, fine flocks of ewes were now kept where scarcely any could be kept before. Also on fen land, which was admirably adapted for the growth of mangold to the extent of 30 to 40 tons per acre, this root was now grown extensively, and although not equal in quality to that grown on high land, it was by no means depreciated in the same degree as were turnips on this kind of land. On all soils salt greatly improved the quality of mangold, and he felt confident on none so much as peaty fen land.

Mr. THOMAS (Lidlington, Beds) said that Mr. Baker had not alluded to a circumstance with which he (Mr. Thomas) had some slight acquaintance, viz., to the seeds being wrapped in capsules, each of which contained three or four seeds. He should like to know whether Mr. Baker had ever tried the experiment of breaking up the capsules (Hear, hear). He (Mr. Thomas) had done so on a small scale in his garden, he had crushed the outward coat through a bean-mill, and he had found, in consequence, that the plants came to the hoe in one half the time that those did which were dibbled in the capsules. One remark which Mr. Baker had made was susceptible of correction. That gentleman had stated that there was this difficulty with regard to mangold-wurtzel, that it could not be fed off the land in the same manner as the swede turnip. He (Mr. Thomas) begged to assure him that so far was that from being the case that in Bedfordshire it was becoming a very common practice indeed to eat it off the land.

Mr. BAKER: You could not produce a heavy crop, then?

Mr. THOMAS begged pardon; he had seen very heavy crops of mangold on light lands. He had seen this on sandhills which had become sick and tired of growing swede turnips. Mangold-wurtzel could be eaten off the land about the months of March and April, and he believed it was more forcing and nutritious than the swede itself at that time of the year.

Mr. STAGG (Grafton, Wilts) said that, like Mr. Thomas, he could not agree with Mr. Baker in all the views he had enunciated on this subject. In the first place, with regard to mangold-wurtzel not being a proper food for ewes, lambs, and pigs he himself had fed his flocks of ewes and sows for many years past, from the month of November to the month of May, upon that description of root, and he had had quite as good lambs as any of his neighbours who had fed their flocks upon turnips. His tegs also had fed upon and done well thereon; so likewise had his sows to a great extent, and he should not be afraid to shew them against those of any gentleman in Bedfordshire. They had had very good farrows, from ten to thirteen at a time; during the whole of last winter he never lost a pig, and he believed he had about a hundred now. With regard to storing of mangold, his practice was to store in heaps of about a cart-load each, first cutting off the greens or tops which are left on the land, and fed by ewes. About two-thirds of the roots are then fed on the land by sheep, the remaining one-third (more or less as required) carted off when convenient, and given to cattle or pigs in the farm-yards. The only objection he ever found was the difficulty in preventing servants over feeding with this root. The store-heaps are covered with straw in the same manner as potatoes. He had a large field now in store of, he believed, fully 40 tons per acre, and had never had a wheelbarrow-full of rotten mangold throughout the whole of his experience.

Mr. WILLIAMS: You don't cut them near the crown?

Mr. STAGG: No, not so near as to run the risk of injuring the crown. With regard to mangel wurzel as a root crop, he considered it most valuable for the farm. On one part of his farm he had grown turnips, but those were to a great extent club-footed, and were what had not inaptly been termed fingers and toes (Hear, hear). Upon heavy clay soils and upon sandy soils that would not grow turnips, it was, in his opinion, quite a godsend to have mangel wurzel to resort to; and he would repeat that he considered it a most beneficial crop for the farm. He had kept 600 sheep for the last 15 years, on the average, although they had scarcely any other kind of roots than mangel from November to March (Hear, hear).

A MEMBER: What sort of a farm is yours?

Mr. STAGG: A store and corn farm.

The MEMBER: And what kind of mangel wurzel do you prefer?

Mr. STAGG: The red globes (Hear, hear). In conclusion, he would merely observe that there was no more difficulty in feeding off mangel than swedes (Hear, hear).

Mr. GRAY (Courteen-hall, Northampton) did not presume to set his production of mangel wurzel in competition with that of Mr. Baker, but having had some years' experience in the growth of this root, he would take the liberty of making a few remarks with regard to the system he had pursued. Of course, he grew it after his white grain crop. After harvest, if the land wanted cleaning, he did what he could to accomplish that object. He then manured with from 10 to 12 tons of dung per acre, leaving it spread upon the land for two months, ploughed it up to a fair depth, and left it until the spring. April was in his opinion the best time for sowing. He set two ploughs to ridge it up, and dibbled the seed in, employing four men for that purpose. Each man carried a little bag of seed hanging from his neck, and dropped in the seed as he went along. He made a compost of turf ashes, malt dust, and pigeon manure, with three hundred of superphosphate of lime per acre. This he mixed up and left to lie a little while before he required to use it, and carried it to the land in carts, and afterwards along the ridges in wheelbarrows, putting a handful of the compost over the seed, that being the covering it had. He should also state that upon depositing the seed, he applied a light roller. Since he had tried this system his crop had never failed, but was always a very good one, although it had failed under every other system. With regard to the transplanting of mangel wurzel, they all knew that if they did not get a full plant it might be desirable to transplant. His own practice was to get a strong force of men and boys, and on the first wet day send them out to transplant his mangold; but let it be observed that if the operation was performed in the same manner as they treated the cabbage, they would get no plant. He put in the little fibres straight, and pressed them down lightly with the soil; for the lighter they were pressed the better. During the present year, he had been particularly successful. He had transplanted more than at any former period, and finer crops he had never grown. The discovery of this fact he had made quite by accident, and he was sure it was worthy the consideration of the farmer. With respect to horse-hoeing, they all knew the advantage of keeping the land well and thoroughly cleaned (Hear, hear). When he took up the roots for storing he set two men with common bean hooks to cut the tops off, and he did not think that out of 10 acres of mangold wurtzel last year he had a single decayed root. This at all events showed that cutting off the tops was not injurious. Then, as to storing, he set four men to fill the carts. Boys were employed to drive the carts away, and it took two men to put the roots in heaps. He thatched as rapidly as the heaps were formed, leaving plenty of ventilation. With reference to the value of the root, he thought it was becoming more important every year. Certainly its feeding qualities were unsurpassed by those of any other. He once showed in Baker-street a Hereford ox, the only root he had being mangold wurtzel, being the winner of the first prize in class 2. Some remarks had been made about the difficulty of growing mangold wurtzel on stiff soils. He himself on one occasion tried the cultivation of it on as stiff a soil as any in England; and he should pity any man who was obliged to produce mangold upon that sort of soil. The system which he adopted was to cultivate in the autumn, manure, ridge up, and then leave it. By adopting that plan very good crops might be grown on such soils, and it was practised very extensively with great success on the cold clay lands of Huntingdonshire.

Mr. W. Bennett: Do you prefer large plants for transplanting?

Mr. Gray: Not very large.

Mr. Bennett: As large as a cabbage plant?

Mr. Gray: No.

Mr. Thomas wished to say one word with regard to feeding ewes off mangold wurtzel. For more than 25 years he had invariably done it, and during the last month previous to yeaning, had always found it to be most beneficial. After trying the system for many years, he made a memorandum of the result of his practice to this effect—that there was no kind of food so suitable for ewes during the last four or five weeks before parturition as mangold wurtzel (Hear, hear). He could assure every gentleman who grew mangold wurtzel, and possessed a flock of ewes heavy with lamb, that he had never found the least injurious results from the practice, but, on the contrary, very great advantage in the production of fat and milk at the same time.

Mr. Gray said that on one occasion, when he was not so well acquainted with its feeding properties as he was now, he had a considerable quantity of mangold down in the month of July, and felt some difficulty in deciding how he should dispose of it. At last he fetched in ten bullocks from the field, and gave them the mangold, with a proportionate quantity of hay, and the result was that he had never seen beasts do better (Hear, hear).

Mr. Coussmaker (Westwood, Farnham) said, as regarded the cultivation of mangold wurtzel, he concurred in the opinion of Mr. Gray, that it was desirable to plough deep once in the autumn, and then leave it. Winter produced a tilth which no power on earth could produce in the spring. The more they stirred the soil in the spring, the more they let the drought into it. If it were left alone, the soil retained a certain amount of moisture, and the seed vegetated quicker. With regard to the stacking of the crop, he agreed with what fell from Mr. Baker. He had used this root a good deal for fattening beasts, and as food for milch cows. He had found the orange globes produce the best kind of milk. He had likewise found mangold wurtzel a most valuable food for store pigs; and, though he had never used it himself for that purpose, he had heard that it was not at all a bad kind of food for horses when mixed with a certain proportion of hay and corn. The long orange was, he believed, a very superior root. Some years ago, a gentleman took a farm near his own for the express purpose of making beet-root sugar; and the sort of root which he chose for that purpose was the long orange. As it appeared that there was an Act of Parliament under which he might be compelled to pay duty on his sugar, he dropped the scheme; but he was of opinion that he might otherwise have cultivated the long orange with great advantage for the manufacture of sugar.

Mr. J. A. Williams (Baydon, Hungerford), said, occupying as he did some of that stiff land which had been spoken of, he had not yet been able to cultivate mangel wurzel to advantage; but he thought the cause was, that he had not adopted the right method. He was more than ever convinced of the utility of that Club, for he was satisfied, from the arguments of Mr. Grey and Mr. Coussmaker, that to be successful on very strong clays the cultivation must take place in the autumn. He happened to have a good description of down land, and having been told by practical men that such land would grow mangel wurzel, he should be glad if any one present could tell him from experience whether or not such was the case. Mr. Baker had spoken of the practicability of distilling from mangel wurzel. He (Mr. Williams) thought that with the prospect of having wheat at 40s. a quarter that was a matter which was well worthy of consideration; but Mr. Baker had raised an obstacle which, if it really existed, would prevent such a desirable object from being attained, viz., that the landlords would not permit, and the tenants would not like, the cartage of a large bulk of roots off the farm, as it would be too much to draw the bulbs away, and the residue back again for feeding purposes. Now he was pleased to tell them that that obstacle was removed. They had all seen or heard of the invention of Boydell's steam-horse, manufactured by Mr. Burrell of Thetford. Mr. Burrell had told him (Mr. Williams) that he had taken out a patent for a portable distillery to meet this very case. He did not think landlords would object to the mere extraction of the spirit if the feeding qualities of the roots were left on the farm; and the steam-horse and the portable distillery might go from farm to farm extracting the spirit from the roots (laughter), and leaving the bulk of the crop for feeding purposes or for manure, and possibly paying the farmer for the extract alone a considerable profit beyond the cost of production. This appears to me to be a move in the right direction, for if we are called upon to grow wheat at a low price, which we cannot do, it is worth considering if it would not be wise to cease to a certain extent the growth of that article, and substitute a larger growth of roots for distilling purposes.

Mr. **Mason** (Somersham, Huntingdon) said his experience had lain entirey among black fen-land, and for fifteen or twenty years he had been in the habit of growing mangel-wurzel on land of that description. He agreed with Mr. Baker that, on light soils, the use of the hoe for the purpose of pressure was very desirable. The pressure which he had used, however, was simply that of the heel. After setting the seed he used a handful of blood-manure, and nothing else; he then resorted to the heel, to secure solidity; and for some years past his roots had thriven exceedingly well under that process. As regards packing, it was of course very important to effect the operation in such a manner as to prevent fermentation. The system which he adopted was this. He invariably mixed his seed, 4lbs. being about the quantity. He used 2lbs. of globe, and 2lbs. of red; and one advantage of this mixture was that, if the one kind failed, as it frequently did, the other still remained to produce the crop. Another advantage of the mixture of the globe with the red was found in the packing of the roots, there being less tendency to fermentation; and, in his own experience, he had sustained comparatively little loss under that mode of proceeding.

Mr. T. **Chandler** (Aldbourne, Hungerford), referring to a remark by Mr. Williams in reference to down land, said that he had cultivated mangel wurzel on land of that description with great success, while his turnip cultivation on the same land was a failure.

Mr. **Baker** then replied. Adverting to the remarks made with respect to the feeding of pigs on mangel wurzel, he said he had tried it in the case of his own pigs, and the result was not satisfactory. With respect to the crushing of the capsules advocated by Mr. Thomas, no doubt the moisture would reach the seed all the better for the external coating being broken, but there was a danger of cracking the seed at the same time. He was very glad that so much interest had been manifested in the subject.

On the motion of Mr. **Thomas**, seconded by Mr. **Harrison**, thanks were voted to Mr. Baker for his able paper; and a similar compliment having been paid the Chairman, the meeting separated.

THE MANAGEMENT OF A FLOCK OF BREEDING EWES, MORE PARTICULARLY IN THE LAMBING SEASON.

"Sheep," said Fitzherbert long ago, "is the most profitablest cattle that a man can have." Since his day so much attention has been paid to the breeding and general management of sheep, and with such encouraging results, that this old writer's statement is more entirely realized than ever he expected.

In the following remarks upon the treatment of breeding ewes I shall not confine myself particularly to one class. I intend to detail the course generally adopted; and if specific treatment is noticed, the locality where it prevails will of course be stated.

We will commence, then, with the *selection of ewes* to put to the tup.

This selection is only necessary where a standing flock is kept. Where the flock is a "flying one," since all are disposed of, none obtain a preference. By a *flying flock* is meant one that is purchased a little before, or immediately after, the lambing season, the lambs being disposed of when weaned, and the ewes, when fat, from coleseed, &c.

The aged ewes, and ewes with no teeth, are first drafted. Some breeders expel every ewe that has had three crops of lambs.

The flock-masters of North Lincolnshire get off their ewes at their fourth year in prime condition, and make topping prices.

But whatever variety of practice there may be, a ewe with no teeth, or defective teeth, where turnips are grown, ceases to be used for breeding, as she would fail to sustain not only her progeny, but herself.

Should the breeder eject from the flock every ewe having a disqualifying property, he might as well give up breeding. Such drafting must, however, depend upon the number of *good* substitutes which the shearling ewes or gimmers may supply, which, of course, have in their turn to be subjected to a rigid examination. First determine the number of gimmers to be admitted, and then draft out of the old flock a corresponding number of the worst animals. Beyond the disqualifications of age and bad teeth, there are some others which I will mention: *thin wool, hollow back, flat sides* (indicating a want of space for the fœtus), *diseased udder, asthmatical affections, and diminutive stature.*

This selection is very important, for with improved form we obtain improved constitution.

Then if the flock is sufficiently large to employ two tups or more, the ewes must be divided into as many classes as there are tups, the breeder designing to correct the defects of the female by the excellencies of the male; and this course perseveringly pursued is always found to result in a regular, sound, and prolific flock.

As ewes are more prolific during their third and fourth years than they are before or after, during which time they generally produce single and weak lambs, it seems that a "flying-flock," could it be obtained of the right age, might be more profitable than a standing flock. There are reasons, however, why such a course is open to objection; but I do not intend to touch upon them now.

The tup commences his work generally on the 11th October, so that the lambs are expected about the 8th to the 11th of March. The date of this operation is varied according to circumstances. For in Scotland the tupping season for Cheviots is from 15th to 22nd November, with the expectation of receiving the lambs in April, when the weather is milder. In the South, where breeders endeavour to supply the London market with early lamb, arrangements are made by which they arrive at Christmas, and from some classes of Dorsets two crops of lambs are obtained within the year. In the north-eastern counties, the north-eastern wind having cut with such a keen destructive edge, during the last three or four years, throughout the month of March, many of the breeders in those districts have turned the tups to the ewes at the end of October, or the commencement of November. I very much question, however, the benefit received from the change. *One* early lamb is generally worth *two* late ones.

Where high-prized sheep are employed, as in the case of a ram-breeder, another plan is sometimes adopted, for the purpose of obtaining the greatest amount of service from the ram, and more regularity of procedure. The rams are kept in pens, while a *teazer*, or imperfectly castrated sheep, is turned amongst the flock, and those ewes seen to be in heat are brought up to the rams selected for them. They are then numbered with a brand, and a note is made of the date, &c.

Ruddling.—It is well, that the shepherd may know what the tups are about, to mark their breasts with ruddle for the first 17 days they are among the ewes, that being the time of the periodical recurrence of heat, and then to use soot. At lambing time the red-rumped ewes, or those that conceived from the first copulation, are brought into the fold, and the black-rumped ones after the proper lapse of time.

Choice of Food.—About a fortnight before ewes are put to tup, they are removed from the stubbles and bare pastures, and put upon the freshest pastures the farm affords, or better still on rape. Failing rape or coleseed they may be folded upon white turnips, or turnips may be carted to them upon grass. Mixtures of white mustard and coleseed, or white mustard alone, are found very advantageous at this season. When this better fare has begun to tell in their improved condition, the tups are turned amongst them ; for under such circumstances the ewes come to heat quickly, and are more likely to conceive twins. And this quickness to receive the male is more important than at first sight appears, since the ram should be removed in three or four weeks from the date of his admission, because lambs begotten so long after the rest will not coincide with them, are often sickly, and suffer from neglect. For this reason poppy-cake, bruised and served in troughs, is used by some, and other stimulants are adopted.

Ewes are then put upon moderate fare, care being taken to avoid the extremes of fatness and poverty. The poor ewe, if she lives through the season of parturition, dies with her lamb, from exhaustion subsequently, while the fat ewe rarely escapes atacks of fever and inflammation, from which cause she sheds her wool, and fails to nourish her lamb either before its birth or afterwards. They do well run thinly on grass land, 1 or 1½ to an acre, with, when the frost sets in, a few turnips or mangolds carted to them, and a rack filled with hay, pea or barley straw, to run to. When the four-course system is adopted, there is generally a necessity for feeding ewes upon turnips, and they then follow the fatting sheep, to eat up their scraps and shells. This arrangement suits both lots, for Swedish turnips produce fatness on ewes more readily than other kinds. As the lambing time approaches, the ewes should be removed from the turnips to the grass or seed, receiving there mangold wurtzel and a little oilcake or oats. It may be remarked here that too much care cannot be observed throughout the month of February, as to the regularity in time of feeding, quantity and kind of food given.

A scant supply for a day or two, or a total and sudden change from turnips to mangolds, for instance, would be likely to produce serious results in the crop of lambs. Sufficient attention is not paid to this fact. The wool suffers as well as the lambs.

Great care at this time should be taken to prevent the intrusion of dogs ; any cause likely to startle a ewe at this period must be guarded against. Unless the shepherd's dog is a very silent reliable animal, I advise that he should be tied up at this season.

The shepherd must now look out for cast ewes ; for a ewe to be long in this position may endanger her life, or cause an awkward presentation at delivery.

PREPARATIONS FOR LAMBING.—*The Shepherd.*—It may be thought curious that I start off, under this head, with the shepherd ; but as upon his qualifications depend so entirely the welfare of the flock, it is of the greatest consequence that we have the right man in the right place. There is no season like the lambing season for trying a man's tact, knowledge, and patience. During that season only, the skilful attentive servant may save his year's wages ; and the comparative results between the skill and attention, and inattention or blundering assiduity, during a precarious time, are truly astounding. Mr. Price and Mr. Youatt, both writers on sheep, seem to regard as natural and proper treatment on the shepherd's part many things that would display a lamentable amount of ignorance and incapacity quite incompatible with the burden of such a responsibility. One instance is given by Mr. Price, of a flock of 800 ewes out of which only 100 pairs were saved ; but that with more skill the number of pairs afterwards increased to 200. The improved skill of one man then saved 200 lambs, which would come to be worth £200, equalling the wages of at least four good shepherds! The shepherd's duties are no sinecure, and can be performed by no ordinary man. Supposing him to have attentively observed the tupping and registered the ewes, and in conjunction with his master so regulated the food as to have kept them in a healthy progressive state, he has now to make all his preparations with a wise foresight only to be gained by experience. The place to lamb in is to be selected, and the time attended to. Further, the requisite assistance, and no more, has to be rendered at the proper instant of lambing, and the lamb and the mother both assiduously watched for days afterwards. Milk has to be given to lambs when mothers are unkind or destitute of milk ; sickness of various kinds has to be watchfully dealt with, and great judgment is required in the breaking of pains and mothering of ewes. Beyond this the operation of castration has to be performed at the proper state of the animal's strength, in the proper state of the weather. Attention to these duties rests almost entirely, and in many cases entirely so, with the shepherd. Supposing then that by performing his part in a skilful manner night and day, until the lambing is not only entirely completed, but the lambs are beyond danger, he saves the lives of ten ewes worth 40s. each and of twenty lambs that would shortly be worth 20s. each—no extravagant supposition in a large standing flock of fifteen score ewes—it is clear that in so doing he will save the amount of his wages.

It is found that skill is better worth having, in a shepherd, even though, as is commonly the case, it is combined with indolence, than the most conscientious and untiring exertion without skill. Under the latter the condition of ewes not unfrequently becomes too high, and inflammation induced, or undue anxiety to help in time of labour, increases the danger to the ewe, and the loss to the master. Mr. Stephens acutely remarks—"Evils will be *prevented* by skilful attention, and *cured* by attentive skill."

The man whose duty it is to shepherd a flock of Leicester sheep or a flock nearly crossed with Leicesters, will have more work than he who tends a flock of Downs or Cheviots, simply because the ewes from more frequently lambing pairs, or producing square-built, big lambs, require more assistance than the sheep of the hill country. However well he has contrived to bring the flock within easy range, his eye and hand are constantly in action, and the master will do well to render him frequent assistance. At night, during a busy time, an extra pair of hands may save many lambs.

Every breeding farm should have a paddock consisting of two or three acres, well protected with a high hedge, and situated near the shepherd's or the farm-house. In lieu of such a permanent lambing fold, a row of faggots, obliquely laid upon the sward, and staked down, or a line of hurdles, wattled with straw, cutting off a bit of the most convenient grass-field, can be made to answer the purpose. Indeed the stack-yard is often used, and with less expense. Set up within the enclosure, in some warm situation against a wall or hedge, roofed with straw, a row of pens, constructed of wattled hurdles or stubble. They serve as a refuge for ewes that lamb in the night, or at any other time of day, and require temporary protection from cold, wind, and rain. If possible the pastures into which the lambed ewes are turned are provided with triangular shelters, or pens made of three wattled hurdles.

The fold is intended to hold either the whole flock, or those who by their marks are expected to lamb first, and they are driven in at night-fall.

Those ewes that have no lamb, termed generally "guile," must about this time be selected and put with the fattening sheep. Their blooming fleece and active motions betray them; and if a doubt exists, the shepherd should examine the udder. If the teat upon pressure yields no dark, thick viscid substance, the fact of no lamb may be considered proved. Before the lambing commences the shepherd must be supplied with brandy, castor oil, Epsom salts, ginger, peppermint, spirits of nitre, laudanum, one or two bottles for milk, a cord, knife and hook; with the most important of these he must fill his *budget*, and the rest must be at hand. For his nightly rounds he will need a lantern, and to facilitate the capture of individuals of his flock without running any, a *crook* is necessary.

Symptoms of Labour.—These are enlargement, and reddening of the parts beneath the tail, drooping of the flanks, impatient stamping, isolation, frequent stretching, shifting from place to place, lying down and rising almost immediately.

Labour and its Phases.—The immediate preliminary of labour is the expulsion of the bag of water from the vagina, subsequent to which ensue violent pains, and seeming desire of relief. But until the yellow hoofs appear in the passage, with the mouth lying upon them, the ewe should be left entirely to itself.

In case the ewe proves too weak to deliver herself, the shepherd must deliver her, with the remembrance that a hasty parturition superinduces inflammation. Experience must guide him as to the proper time to wait between the appearance mentioned and the assistance rendered.

Where the shepherd is alone, the most sensible mode of delivering a ewe is by gently laying her on her left side. He then bestrides her body, kneeling, with his right knee against her loin, his left heel against the lower part of her abdomen, and, of course, his face to the tail. Thus with both hands free, he proceeds to push out from him, with both hands, one leg of the lamb, and then the other, and seizing both legs above the fetlocks with his left hand, he pushes them downwards from the ewe's back. With his right hand he endeavours to free the head of the lamb from the vulva of the ewe; which done, the action of the hands being simultaneous with the strainings of the ewe, only *helping* not *tearing*, the operation is completed. Pains are taken to induce the ewe to recognise the lamb; it is placed near her head, its tail is put in her mouth, and if she attempts to run away, as many will do from their first lamb, she is penned with her lamb, and if necessary penned in very close quarters, so as to prevent her butting it.

If the ewe continues to lie and strain after the delivery, it may be supposed that she possesses a second lamb, which may be delivered in the same fashion. It not unfrequently occurs, however, that one of these two lambs is dead, or misplaced. In case it is dead, and has been so for a fortnight, it will be sufficiently rotted to allow of being pulled away peacemeal. If it is not so far decomposed, it must be cut away. When a false presentation does occur, the shepherd must gently endeavour to rectify it, by introducing his hand, well lubricated with fresh lard. And the less dogging and disturbance of any kind the ewes receive during pregnancy, the less risk is there of unnatural presentations. In case of twins there is danger of mistaking the legs.

Supposing the head to be bent back, it must be brought forward; and the legs, if bent, must be pushed back and straightened. The presentation of a *breech* gives rise to a difficult case, and renders the delivery tedious and painful. The hind legs must first be brought out, and the rest of the body must quickly follow, or the lamb will be drowned in the liquor amni.

Or it may be necessary to rest the ewe on her shoulder, raise her rump, and turn the lamb with the hand in the womb, to its proper position.

There are many curious operations rendered necessary by the delivery of malformations; but it is not necessary to dwell upon them here. Before I pass on, however, I will remind you that in case of twins the ewe may be so employed with and fond of the first-born, as to cause the pains of labour to cease for the second. The unskilful shepherd may be misled by this fact, and keen observation alone detects her true state.

To reproduce pains in such a case, or where fruitless pains have been succeeded by apathy, two table spoonsful of ergot of rye, repeated as a second dose in a quarter of an hour, will be efficient.

From the after-pains or reaction of the womb after birth, great loss is often sustained. This malady manifests itself sometimes immediately after parturition, or not until the first, second, or third day. It seems to be the effect of the great exhaustion of the nervous system. If it continues twelve hours, the life of the ewe may be given up. In severe cases a dose of two ounces of *laudanum* may be given three times a day. Inflammation of the womb after lambing is usually seen between the first and fourth day. Its course is very rapid and fatal. Bleedings, and purgatives of Epsom salts, are the usual remedies. The true preventive is care not to overfeed previous to lambing.

A little trouble is likely to be occasioned to the shepherd by a protrusion of the uterus in some of the ewes. A stitch or two with a needle-and-thread to keep it in, and a little laudanum to prevent paining, will generally suffice; but the ewe should never again be used for breeding purposes.

It may be as well to mention here that the placenta drops soon after delivery. It should on no account be allowed to lie upon the lambing-ground. Indeed, the pens and paddock cannot be kept too clean, or too frequently bedded, as many losses occur to the slovenly manager from the contact of rotting and impure substances, at this time, with the inflamed and lacerated parts of the ewes.

Suckling, &c.—It is well for ewes producing twins to be separated; for if, left in the crowd, they lose sight of one lamb, they often refuse to recognise it again, even if the separation has not existed three hours. There are endless repudiations and capricious partialities now shown by the ewes, which try the patience of the shepherd. But, as a rule, the maternal affections seem to be much dependent upon the flow of milk; and the shepherd, seeing that the well-filled udder is his best friend, never ceases to tease the farmer into large grants of cake and corn for the sucklers. Care should have been previously taken to divest the region of the udder of all wool; for its presence in the stomach of the lamb is a certain cause of death. Having exercised even great care in this particular, I have lost many lambs. The symptoms are, violent working in the body, with frothing at the mouth.

The first aim of the shepherd is to ensure for every lamb, as soon as possible after birth, a good drink of warm milk: this once accomplished, he rapidly increases in strength and ability to bear cold weather.

In the case of shearling ewes, who usually have a scant supply of milk, cows' milk is resorted to. New milk is supplied to them by means of bottles fitted with a mouth-piece, through which the lambs suck; or there are other modes of administering the lacteal stream of life: but the chemical constituents of cows' milk and ewes' milk, meeting in the stomachs of lambs, certainly do not agree well. Particularly they do not where the cow from which the milk is obtained has calved recently. Ewe-milk is poor in butter, but rich in curd; which is known to be the character of that of cows calved six months, and not again pregnant.

Should a ewe show indisposition to allow her lamb to suck, her udder should be examined. If it is hot and hard, exhibiting tumorization, fomentations, with the internal administration of Epsom salts, will be useful, followed by the vigorous thumps of the lamb, dispersing the tumour and promoting the flow of milk. Camphor and spirits of wine and Castile soap are a stronger remedy.

There is another troublesome piece of business for the shepherd at this time—I mean the *Mothering of Lambs*. This has to be done when a ewe dies, leaving lambs; when the lambs die, leaving a good flow of milk behind them, for the benefit of the wee things that are left destitute; or when a fine ewe, with abundance of milk, has but a single lamb, while a poor or young ewe has twins; the shepherd seeing it best to break the poor ewe's couple, giving twins to her that has the best supply for them. If this is done when the lambs are wet, there is no trouble involved; but the effort to induce a ewe to recognize a lamb that has been dropped some days, is very trying to the patience. Various methods are adopted to cheat the mothers, the shepherd rubbing the body of the lamb to be received with the body of the dead lamb; or (if in the case supposed last) with the body of the live lamb. If this will not do, the dead lamb is skinned; and the stranger, invested in its tegument, deceitfully obtains, like another Esau, the parental blessing. Close confinement is usually necessary to render these arts effective.

Those lambs unsuccessful in this line of deception, or, may-be, supernumeraries, depend upon the kind attentions of the shepherd or the dairymaid.

Before I pass from this portion of the subject, I must remember to say that, if the shepherd's house is not near, he should have access to some outhouse or moveable shepherd's house, with a fire, before which, wrapped in flannel, he may put such lambs as require this attention, as many do, during those cold stormy nights when lambs usually arrive in greatest abundance.

I must also remark that, should a case of puerperal fever occur, the shepherd must avoid touching the ewe so affected. If he has done so, some other person must take his accoucheur-duties for a few days, as the malady may be communicated to numbers of the flock by the shepherd's hand. Same one else, too, must do all the skinning, &c., during the lambing time.

CASTRATION AND DOCKING.—Ten days to a month after birth, all lambs not reserved for tups are to be castrated. The parts have not at this age attained too much rigidity, nor is the lamb so fat as to render fever imminent from the operation.

Authority says "it is best done early in the morning, in a fresh breeze, and by no means should the lambs be over-driven and heated previously." The *modus operandi* is as follows: The captured lambs are one by one placed with their backs upon the right shoulder of a stout lad, who doubling the corresponding fore and hind legs together in either hand, holds them steady in that position for the shepherd, who simply forces up the testicle with his finger and thumb, slits the purse, seizes the testicle between his teeth, and draws it out till the spermatic cord is broken, and so on. There are other plans, but none so simple as these. When the parts get too rigid to allow of the operation being performed with safety, silk thread is tied very tightly round the testicle, and circulation being cut off, they drop off in process of time. This seems a less barbarous, but more troublesome mode than the former.

The opportunity is now taken to dock the tail, dividing against the third joint. The object of this operation is to keep the sheep clean behind, which cannot be done when they wear long tails.

The lambs, after castration and docking, should not be placed in high lank grass, or on stubble, where the parts can be irritated. Having surmounted these difficulties and risks, the shepherd may now begin to calculate his successes. Stephens says, "He should not be satisfied with his exertions unless he has preserved one-half the number of ewes with twin lambs; nor should he congratulate himself if he has lost a single ewe in lambing." "In regard," says the same writer, "to the yield of lambs of the Cheviot breed, it is considered a favourable result to rear a lamb to each ewe; with Southdowns a little more; with *black-faced* ewes 18 lambs out of the score of ewes is perhaps as favourable. Cheviots yield a few pairs, Southdowns more, black-faced ewes very few, while half the number of Leicester ewes should have twin lambs."

AFTER-MANAGEMENT.—So soon as the lambs are fairly a-foot, their dams are turned with them into the most forward piece of seeds, or to rape, rye, winter oats, or water meadow; the great point being to have abundance of succulent green food for the ewes as soon as they lamb. The ewes bite very closely, and eat constantly while lambs are with them, so that they shortly trim-off the grass or seed in a season unfavourable to vegetation. This fact renders the farmer much uneasiness; for when the pasture looks brown, he knows that he must either remove the flock, or, by keeping it where it is, impoverish the lambs, and so bite into the heart of the grass or seed, that the summer will pass before it recovers from the treatment.

The addition of a water-meadow to a farm is most valuable at this season, for these will always have a supply of food when other pastures are bare. Matters should so be arranged that there should be a succession of fields for the ewes and lambs, passing them on from one to another, and so resting each piece alternately, which will be found a more effectual method than that of stocking all lightly, but continuously. In removing lambs from a short to a full bite, caution is needed. It should be accomplished, old hands say in dry weather in the afternoon: else we have a flush of that quality of milk which produces *green-skit* in lambs. The premonitory symptoms of this malady are, general dulness, watery eyes, and stiff joints; half-an ounce Epsom salts with half a drachm of ginger is the best aperient remedy, to which may be added a table-spoonful of cordial, consisting of equal parts of brandy and sweet spirits of nitre. When the action of the stomach shall have been stopped by the curding or coagulation of milk, an alkali should be employed to dissolve the coagulum. The best to be so used is magnesia. Painful heaving of the body indicates the cause of disease. With respect to *costiveness*, half ounce doses of Epsom salts repeated every six hours until relief is afforded, and removal to a more succulent pasture, are the proper remedies. Epsom salts will, too, generally relieve *fever* in lambs at its commencement. This malady is indicated by quick breathing.

Medicine can only be resorted to in individual cases. Where a malady prevails throughout a flock, it is best generally to meet it by judicious dieting.

The ewes must be kept in a thriving condition, that is, progressing all summer, and on the 20th of July or thereabouts, the lambs should be removed to a good clover eddish, at a sufficient distance from their mothers to prevent the one lot hearing the bleating of the other. I say that the lambs should be removed; but it will be better to say that the ewes should be removed, leaving the lambs where they were, for a day or two before the change is made. So that if they are to go upon clover eddish, it would be well for ewes and lambs to go there together for a day or two before the separation takes place. Experience will show that too much attention cannot be paid to such apparently trifling matters. It is in assiduous attention to such trifling circumstances that a farmer's profit consists.

I must not forget to state that when the ewes are shorn, the lambs should be dipped in a composition of arsenic: easily pre pared by boiling soft-soap, arsenic, and sulphur together.

This is done that the "ticks" they possess may be killed; for being the only harbours for them now their mothers have lost their wool, the lambs would be so irritated as to render all improvement impossible.

In conclusion, to be really successful as a breeder of sheep, the farmer must not be satisfied with a knowledge of his flock in the aggregate, but he must be intimate with the members of that flock individually, and their antecedents. This can only be obtained by going down thoroughly and personally into the practical details, as very few breeders care to do. None know the trouble, care, pleasure, and profit of such a course, but such as practise it. Not a day should go by, without the farmer passing in review every sheep beneath his eye; and at least once a fortnight they should all come beneath his hand, as the touch is the best test of condition and comparative improvement that can be employed. Such constant attention will give a power of discernment to be obtained in no other way; and it is the possession of this power alone which constitutes the profit of the flock; for the unobservant and careless master will only discover a malady when it has gone too far to be remedied, while the observant master will detect by a species of anticipation, and *prevent* rather than attempt to *cure*. To this homily I will append a remark made by that indefatigable general, the late Sir Charles Napier, when at Cephalonia, and leave my readers to draw their own deductions therefrom :—"How entirely all things depend on the mode of executing them! How ridiculous mere theories are! My successor thought, as half the world always thinks, that a man in command has only to order, and obedience will follow. Hence they are baffled not from want of talent, but from inactivity; vainly thinking that while they spare themselves, everyone under them will work like horses." EUMÆUS.

WINTER FOOD FOR CATTLE.

SIR,—The importance of winter food for either horses, neat cattle, or sheep, is so generally acknowledged, that there can be no need for any apology in offering a few hints as to the likeliest methods of getting up a supply. The turnip, the carrot, and the beet, formerly garden stuff, have all been long ago pressed into the service of agriculture: even the tender exotics have been forcibly taken possession of, and the cucumber family itself has been taxed to feed the cows, in the shape of gourds, &c. After such examples as these, let no one be surprised at any botanical extravagance that may hereafter be perpetrated.

The gourd, beet, carrot, and turnip require delicate handling and a fine tilth, besides skill and capital, and necessarily imply a considerable advance in shelter, drainage, levelling, &c; but there are situations of mountain, moor, morass, crag, cliff, &c., where cultivation of the above-named herbaceous plants is entirely out of the question; and as there are some thousands of acres of waste that receive rain and sunshine in England, and yet produce little return, it is time to try if these unprofitable servants could not be set to work. Most farms have some waste lands, and the following experiments might be tried on a small scale on these smaller wastes first, before attempting them on a larger scale. To propose anything tender as a tenant of the waste would be quite out of the question, therefore I shall proceed at once to lay before the readers of the *Mark-Lane Express* my reasons for suggesting the adoption of shrubs instead of herbaceous plants into the agricultural service.

There is a limit set by Nature to the culture of hardy plants, viz., the line of perpetual snow; and if we wish to know what tenants would suit our waste lands, bleak and dreary as they may be, we should consult the plants that have skirted the line of perpetual snow, and we shall find them ready to volunteer into a better country, and as we have no place so bad as the place they have left, it will be seen that they are decidedly bettering their condition, and thus all danger of growing them is at an end. I need not enumerate the plants that do not concern the farmer, for the lichens and other cryptogamous plants are not to be cultivated by any ordinary tillage, but the birch and the willow have their representatives in the high hill-tops bordering the boundary line where all vegetable life is wanting; it is to families like these, then, that we must look for the support we so much want of winter fodder. The tops of the heather may give a bite of green food for the "*hill wether*" to keep in life till the return of spring, but the plant is not adapted for a better place, and its rate of growth will for ever fix it to the mountain. It is far otherwise with the willow family. "*Growing like a willow*" is an idiom of our language; and when we see shoots of this tree (for it has both shrubs and trees) six feet long in one season, we cannot fail to appreciate the willow as a valuable fodder plant as far as bulk is concerned.

Some years ago I bought a goat and a kid, to try how many species of trees produced leaves and twigs that the goat would eat. Suffice it to state, here, that she ate the willow greedily; and when I was showing the experiment to an English nobleman who had travelled a great deal in the North of Europe, he told me that he had seen hay made of willow, and that it made good winter food. The willow has a great spread of foliage, and the amount of cellular tissue in the leaves and bark bears a very large per-centage indeed to the woody fibre of the green shoot. All immature leaves, by a law of nature, adhere firmly to their shoots: when the leaf is ripe, it cuts itself off, with a clean-healed wound, in a very workmanlike manner; therefore in making hay of shrubs the leaves must be decidedly unripe in order to adhere to the stems. I need not tell any one that the willow will grow in any mud-bank at the level of the sea, and I have already said that the Salix antarctica on the mountain is a creeping shrub on the verge of perpetual snow. This immense range, from undrained swamps to bleak hill-tops, speaks volumes for the economical use of the willow; and if any one were to introduce a plant half as useful as the willow, to our agricultural societies, from some foreign country, he would be considered a benefactor to agriculture. When goats and rabbits bark trees for food in winter, they teach us an excellent practical lesson—viz., that the bark, and even the wood itself, is not so bad an article of food as we might have thought it to be; and when we see a person able to convert the woody fibre of an old shirt, or even a heap of sawdust, into sugar, we find that it is not without reason that the hares and rabbits have a nibble at the apple-trees in winter: but I should despair, after all this, of doing any good with such a subject, were it not that I have already one link in the chain, to weld this idea into—namely, the gorse, which seems now fairly adopted into agriculture. Yes, it is a fact that horses have actually been eating sticks, and thriving well on them. Thirty years ago, I saw the whin-mill at work, reducing the prickly fodder of the gorse-plant into food for horses; and all evidence, then and since, goes to prove its vast importance, not only as a tenant of the waste, but even as a cultivated plant for fodder.

After a very long acquaintance indeed with the plants indigenous to our clime that are likely to prove of service to us in cultivating what may properly be termed our wastes, I find only three that seem perfectly at home as slaves, or drudges, to do this dirty work; and they are—first, the willow, that is willing to grow in our osier-beds, in that which has not even the name of "dry land:" it will also thrive well anywhere else, for it is propagated by cuttings merely stuck into the ground; and if there be only one joint in the ground and one above it, the tree is planted. Willows are used by planters as nurses for other trees; and M'Gregor found the black sallow particularly excelling as a screen against the sea-breeze. My father showed me large willow-trees, that were once the twigs used for tying up the bundles of trees from the nursery; and when he had planted the trees, he cut these twigs into sets, and stuck them into the ground: therefore, what I have stated about the willow is no experiment now, but an established piece of practical planting. Next in order comes the gorse, as a plant for waste lands; but of this I mean to say nothing, and pass on to the third slave or drudge, which is the ivy. This plant is one of our most beautiful evergreens, and is well known to gardeners and planters as a very bad character. It is so uncharitable as a neighbour to other shrubs and trees, that it beggars the earth in which they grow by its roots, and fixes the bark of even large trees so tightly to their stems, that the trees are actually choked by the network of ivy-shoots. All this merely illustrates the fact of this important plant being out of place. I have seen the same plant covering the grey face of a huge rock, and have seen the birds flocking to it for shelter; and in winter, when scarcely anything else was to be seen for snow, I have seen the shepherd cutting his ivy, and the anxious flock waiting around him for its downfal. The range of this plant, therefore, in no way interferes with that of the willow or the gorse; for it has a region of its own. It is a most determined grower. Wherever it can find a little vegetable mould, it will stick on like a leech, and never misses an opportunity of raising itself on any prop that comes in its way. It grows freely from cuttings, and still more freely from its berries, which, in good localities, it bears plentifully. It has no prickles, like the gorse, to contend with in its cultivation; and it forms a scene of singular beauty wherever it is cultivated. As a cover for game, it is a plant of the highest importance, and should never be planted where it has to be rooted out, as it is very unwilling to be dislodged when once in possession.

The limits of a newspaper will only admit of a hasty glance at these matters; but, as they will fall into hands that only require reminding, and to whom the things spoken of are no strangers, I must let them pass without further comment.

I remain, Sir, yours respectfully,
Alex. Forsyth.

100, *Quay-street*, *Manchester*, *Feb.* 24.

A SUCCESSFUL METHOD OF RAISING DUCKS.

Believing it to be the duty of every individual to contribute, for the benefit of society, any information he may possess, however small, and on subjects ever so humble, and having for several years past been in the habit of seeking recreation during those hours which were not devoted to severer studies and labours, in a variety of experiments on subjects of Natural History, I propose giving you the result of some experiments in raising ducks, were carried on during a number of years, and which finally eventuated in complete success. It is sometimes beneficial to examine the causes of our failures, and it affords me pleasure at this moment in retracing the steps by which, after many disappointments, I gradually accomplished the objects to which my inquiries and experiments were directed. As an account of the process by which I arrived at these successful results may not be uninteresting to those of your readers who devote themselves to rural pursuits, and who pride themselves on having a well-attached poultry-yard, I hope it may be no tax upon their time and patience if I go somewhat into detail.

During many years I was struck with the general want of success which attend the raising of this species of poultry. Not one-sixth of the young were ever raised; they appeared to be subject to inuumerable diseases. Those that escaped were stunted in their growth, and did not arrive at full size till they were many months old.[*] The general complaint among farmers and planters was, that this, the most valuable of our poultry, was a puny bird, hard to raise, and subject to many diseases. They could raise fowls and even turkeys, but there was no certainty with regard to the duck. Desirous of investigating the causes of a failure in raising a bird which in its wild state is very hardy, which although exposed to all the vicissitudes of the weather, raises large broods of young, I procured several ducks, determined to pursue my experiments in various ways till I should either be successful, or be satisfied that in a state of domestication there existed obstacles to their successful rearing which no foresight or care could prevent. At first I adopted the usual mode of giving them access to as great a body of water as I could provide for them in the yard. I therefore had an artificial pond made near their coops, to which they could resort as often as they chose: where they amused themselves at all hours of the day, in dabbling around the edges of the pool, and in swimming and diving in the water. But they did not grow; they were subject to cramps and fits; and one after another died, until I began to think that water was not their proper element. I varied their food; gave them rice flour, corn grist, boiled potatoes, hominy, bran, and many kinds of vegetable food, but with the same results; and of a hundred young that were hatched, I scarcely raised a dozen. I then began to mix with their food various medicinal herbs, believing that this might correct some deleterious properties of their food; but it was to no avail. I next procured the different varieties of ducks for breed, thinking that perhaps one kind might be better suited to the climate and to the confinement of the poultry-yard than another; but I was soon convinced that my want of success was not owing to my breed of ducks. Several years passed away, and left me pretty much where I began, and I was almost ready to abandon any further attempts at raising the ducks.

The thought at last occurred to me that in the food with which we usually fed this species of poultry we departed widely from nature, and that although the old ducks in their wild state fed on rice and the seeds of various grasses that are found along the edges of the rivers, brooks and ponds, yet that at the spring of the year, when the young wild ducks are hatched, there are few seeds ripe; and it is questionable whether at that early age they feed at all upon grain or seeds. There appears in the digestive organs of these young birds something unsuited to this kind of food; it passes through them without affording much nourishment. I had ascertained by dissection that their gizzards were filled not with vegetable food, but with the fragments of small craw-fish, worms, and various aquatic insects, as well as the spawn of fishes; and I determined in the following year to try the effects of animal food. In due time my young ducks were hatched; beef was given them at first, after having been chopped very fine; this they devoured greedily, and ate it in preference to all kinds of vegetable food. The effect upon their health and growth was immediate and surprising. They appeared to grow faster than any other poultry; in a few weeks they were out of danger, and in a few months fit for the table. As beef was expensive, I tried cheaper kinds of foods, such as the haslets of animals, crabs, fishes, &c. The result was equally favourable. I was now satisfied that in the article of food the end is attained by simply following Nature and giving the young ducks animal food. But although my experiment was thus far favourable, I found that many of my young ducks died after having been suffered to go in the dews and water; and that after many showers of rain they became thoroughly wet, and that when showers were succeeded by hot suns they were subject to a disease of some apoplectic character, or a *coup de soleil*, which killed numbers. Here I was much puzzled. I had succeeded in one instance by following Nature; but I found that I could not carry my theory through, and that water affected the domesticated duck very differently from what it did the same bird in its wild state. The fact was not unknown to me that the down of young wild ducks is almost impervious to water; they are exposed to dews and rains, they dive to the bottom of pools and streams, and live in the water; yet they always keep dry. An oleaginous substance is spread over their feathers, from which the water glides off instantaneously, and leaves the birds dry during all weathers. Not so with the young of the domesticated duck. Owing either to the confinement of numbers in a small space, where their down becomes ruffled and displaced, or to their not being able to procure that kind of food which in the wild state is favorable to the secretion of that peculiar oil which is found contained in the glands of birds, and which serves to lubricate their feathers and protect them from the wet, the down of the young tame ducks soon becomes thoroughly wet; and when this is once the case, it is subject to various diseases, and is difficult to raise. To accommodate the young duck to that artificial state into which it has been thrown by domestication, I found it necessary to adopt some mode by which during the first few weeks of its life (the only time in which it requires much care) it might be preserved from the effects of that element which in its native state is almost its only residence and furnishes its subsistence.

A little reflection enabled me to guard against the inconveniences and dangers which result from this state of domestication. I had my coops built pretty large and tightly shingled, so as to be impervious to water. The young ducks were not let out in the morning dews till the sun had dried the grass; and the vessels in which their water was placed were railed over so that they could drink by inserting their bills between those little railings, but were prevented from getting into the water. After following these simple directions with regard to their food and shelter, I found that, by a little attention of a servant, I could supply my table with ducks the whole year round, that I seldom lost one in twenty, and that they were free from all diseases. I raised from 100 to 300 ducks per year, and now found that they were the easiest of all poultry to raise. I communicated the result of my experiments to my friends. Those of them who had the disposition, the patience, and industry, followed my directions, and in every instance met with the same success. I have their assurance that they can raise ducks in any numbers, and some of them have for the last two or three years supplied our markets with from three to five hundred ducks of the largest size and fienst flavour.

After having carried my readers through this, perhaps to them, tedious detail of experiments, which cost me much time and attention, but for which I was more than repaid by the successful result, I shall now proceed to give, under different heads, such simple directions as will enable our planters and farmers to supply their tables with this kind of poultry, which might be an object to those who are in the habit of supplying markets.

1st. *The Species and Varieties of Ducks best adapted to the purpose of Breeding.*—The only two species of ducks that are raised in the United States are what are commonly called the English Duck and the Muscovy Duck. The English Duck is a descendant of the wild duck that visits us evéry winter in such numbers, called Mallard (*Anas Boschas*); is found also in Europe, and breeds in England. Although not the largest, it is certainly among the finest-flavoured ducks in the world. The flavour of the famous Canvass-Back Duck (*Anas Vallisneria*) that is found so numerous in the Chesapeake, and more recently in the Santee and at the mouth of the Savannah River, is no doubt, superior to it, but it is supposed that this is owing to the peculiar kind of root on which that bird feeds, believed to be the *Vallisneria Americana*, and that were it fed on common food its flavour would not be superior. The English Duck, which is so common in our yards, has, from its long domestication, run into a number of varieties which differ so much from each other as to appear like different species; they are of different sizes, of a variety of colours and some are tufted. The variety to which I have usually given the preference, goes by the common name of Madagascar Duck; is distinguished by its being of the largest size, having a pretty long neck, and almost invariably a light streak above the eyes, and usually a small streak extending from the lower part of the upper mandible to below the eye. The Muscovy Duck (*Anas Moschata*) is another duck more recently introduced, but which is now very common, and is well deserving a place in our poultry-yards. It was formerly, by most writers, considered as coming from the Eastern Continent; but is now well ascertained to be a native of South Amerca. This duck, in our southern climate, is, perhaps, more hardy than the other: sets more steady on its eggs, and lays in the spring and fall. A mongrel breed between this species and the English duck is easily produced, and has become common; but these, though they are good layers, are unable to propagate their species. There are other species of ducks, which the curious in these matters have partially succeeded in domesticating. I once saw a fine flock of the Gadwall Duck (*Anas Stropera*) which an individual in the upper part of the State of New York had succeeded in raising from ducks which he had captured, and which bred freely in his yard, and made no attempts at flying away. Our beautiful summer duck (*Anas Sponsa*) breeds freely in some parts of France and in the Zoological Garden, in England. But it is very probable that the two species above mentioned are as well adapted to our purposes as any other, and that for many years they will be the only ones which will be generally kept in our poultry-yards. One drake will answer for five or six ducks; where mongrels are to be bred, place in separate yards one Muscovy drake to four English ducks.

2nd. *The best mode of procuring an abundance of Eggs.*—When ducks are raised in the country and have access to rice-fields, ditches, ponds, and the borders of rivers, they find food best suited to them, and generally lay early and freely; but where they are necessarily kept in yards, and do not possess the above advantages, it will be necessary to adapt their food to their situation. A mixture of any kind of animal food with their rice-flour, corn meal, or grist, given them regularly and plentifully three times a day, will enable you to procure a great abundance of eggs; where this is neglected your English ducks will lay but sparingly. I have observed that animal food is not so necessary to the Muscovy duck, but that they generally lay freely on being fed on grain alone.

3rd. *Sitting and Hatching the Eggs.*—The English duck, although a good layer, is very careless about hatching its eggs until late in the season. I have invariably used the common hen for that purpose; and when the young ducks are removed, as soon as they are dry their foster parent will sit again on other eggs, and I have thus known a single fowl to bring out three and even four broods of young ducks in succession. In that case she should be repaid for her faithfulness by being richly fed. The young ducklings in this climate leave the shell on the twenty-sixth day; the Muscovy sits a few days longer. A fowl of tolerable size will cover from thirteen to fifteen eggs. After the eggs have been four or five days under the hen, you may in the evening examine the eggs by the light of a candle or lamp. Place the eggs longitudinally between the fore finger and thumb—if the egg is likely to hatch, it will be of a dark colour, with streaks of red frequently perceptible; and the cavity on the thick end will be somewhat enlarged and transparent. If it is a clear egg, it will be wholly transparent, and it ought to be removed at once; and if it has not been too long kept in the nest, it is still fit for use.

In this way, when several hens have been set nearly at the same time, it will frequently be practicable to remove a sufficient number of clear eggs, so as to place a fresh setting of eggs under one or more of them. The Muscovy duck sits faithfully, and may as well be permitted to hatch her own young.

4th. *Method of Destroying Fowl Lice.*—The insects which infest the sitting hens may be easily destroyed by thoroughly sprinkling the nest and wetting the fowl even to the skin with a strong decoction, made by pouring hot water on a good handful of common leaf-tobacco, mixed when cold with a table-spoonful of spirits of turpentine, and double the quantity of gunpowder. It will be well also occasionally to take away their old nest, and make a new one of fresh hay or straw.

5th. *Duck Coops, Food, and manner of Rearing the Young.*—Let your coop be made pretty large, say three or four feet in length and three in depth; let it be well shingled so as to exclude all water, and have a good pitch towards the front; let it be tight on three sides, and barred in front, with a slide below the lower bar, so as to retain the ducks in unfavourable weather. A space of 10 or 12 feet square, formed of common boards set up edgewise, will, when you have not much room in your yard, suffice for fifty ducks. Keep making coops in proportion as your ducks increase in numbers, and endeavour to keep the different sizes separate. The first brood, early in the spring, requires for a few days the warmth of the hen's body; and she should not be made to take care of more than twenty or thirty. A little later in the season, the young that are then hatched do not require the services of their foster-mother, and may, from the beginning, be placed in a coop by themselves, to the number of fifty. Young Muscovy ducks may be treated in the same way, and they and the mongrels and English ducks may all be indiscriminately reared together. As soon as your young ducks are hatched, let them be placed together for a few hours in a basket containing some warm inside lining; and when they have sufficient strength, place them with the hen in the coops; feed them with meat or animal food of any kind, chopped fine with a common chopping knife; for convenience I have usually had it boiled; a little rice-flour or corn meal may be mixed with it, and the latter may be increased if you have but little meat. Let this be continued for three weeks, and they are out of danger, and can be raised on any kind of food. Still it is to be observed that ducks will, in all cases, thrive better on animal food; and where this can be conveniently obtained, it may as well be given them. Those planters who live near our seacoast, by running a tight board fence across any small branch of salt water, and placing in the centre a fish trap made of laths, can easily procure a sufficient quantity of fishes and crabs to feed all their young poultry. A man with a cast-net could in half an hour do the same. I have known persons in the interior of the country substitute squirrels, rabbits, and even venison; and one gentleman fed his young ducks on the flesh of alligators, thus rendering that which was a nuisance subservient to his profit. When your young ducks begin to be tolerable feathered on the sides, which will be in five or six weeks, they may then be turned into the common poultry-yard, always bearing in mind that those which are best fed and obtain most animal food thrive the fastest.

I have not treated of diseases to which ducks are subject, since by the above treatment I have generally found them healthy. As this is a long essay, and may be too great a tax on your readers to peruse, I would give in a single line the substance of my directions for the successful rearing of young ducks: *Give them animal food, and keep them dry.*—American "Southern Cultivator."

HOW GOOD AND BAD HARVESTS COME IN SUCCESSION.

A lecturer upon astronomy the other day astonished his audience by stating that the prices in Mark-lane were greatly influenced by spots distinguishable upon the face of the sun. These he went on to describe as continuing to increase in number for the space of upwards of five years together, until about three hundred became observable, when in like manner they would again decrease through another period of time, the temperature of the earth being diminished or increased in corresponding ratio. This is pretty much in accordance with the prevailing opinion that good and bad crops are produced in cycles, which have however been ascribed to embrace periods of seven years each, instead of five years' duration, as here stated. Whether it be one or the other, or neither, remains yet to be ascertained; and this can only be accomplished by comparing results extending over a number of years together. It is quite certain that some operating cause continues to produce several fine seasons in succession, and bad ones inversely. This effect will most probably be hereafter traced to electricity, which is acknowledged to be the active agent directly producing atmospheric phenomena.

Upon looking back to our journal we perceive that 1831 was the concluding year of a series of seven wet and cold seasons preceding; and 1832 the first of a series of years unprecedented for productiveness, which continued with but little variation until 1840 and 1841, both of which were wet seasons, while 1842 was remarkably warm and dry. And so likewise were 1846 and 1847: in the former year the potato murrain first appeared; the crop up to the 27th July had shown no symptoms of disease; but the temperature, which up to that time had been very high, suddenly fell, accompanied by heavy rain. 1849 and 1850 were wet and unproductive seasons, and 1855 variable, but mostly backward, until 1857, one of the most genial and dry seasons on record, and attended with great productiveness. Upon tracing still further back, we find the year 1816 associated with an extraordinary wet and late season and harvest; then 1817 fair; 1818 hot and unprecedentedly dry; 1819, 1820, and 1821, mostly cold and moist; 1822 fine, and an abundant crop. So far we have data; which, upon examining closely, we find that taking seven years previous to 1832 the seasons were wet, cold, and unproductive; from 1832 they were mostly dry, and all of them productive; antecedent and subsequent to these periods they were so variable that no continuous series can be traced sufficiently to corroborate the theory we are investigating. The winters most remarkable for severity are 1814, 1823-4, 1827, 1839-40, and the summers from 1824 to 1831 were exceedingly wet and cold, especially at the latter end of May and to the middle of June—all of them being unfruitful.

So far it appears that the productiveness of our green crops is mainly dependent upon the state of the weather from March until the middle of June, and more especially upon the temperature during the month of June, that is from the 1st to the 21st. A dry May is very conducive to the formation of a full-grown wheat-ear, and a dry and warm temperature in June for bringing it to perfection. Whenever the temperature of the weather is such as to bring it quickly forward at that immediate period, with a fine and dry state of atmosphere, but little danger need be apprehended of a good yield. The subsequent weather throughout July being of the same character, an abundant crop may be calculated upon.

The injury sustained from insects is also almost superseded in such state of auspicious weather, as it has been found that the wheat-midge can effect but little mischief, and that mildew is not extensively produced in such seasons.

So far as we are enabled to trace effects, we find that the productiveness of our cereals is mainly dependent upon a warm and dry atmosphere; but that such a state of weather can be foretold or be calculated upon from the average of preceding years, we could hardly venture to say. There is, still, a prevailing notion of good and bad seasons following each other in cycles of years.

The temperature undoubtedly is little changed for several years in continuation, but not with such a degree of uniform regularity as to establish any rule therefrom. It has been observed that whenever the general temperature is lower than ordinary, such seasons are most generally rainy; and although we cannot trace the immediate cause of rain prevailing for-long periods together, atmospheric phenomena are undergoing such investigations as will probably ensure an approximation to this. Certain known laws affecting the cause and amount of rainfall in various countries and districts have been already ascertained and established. Rain is found to decrease in quantity from the equator to the poles, and to increase in quantity from the coast to the interior of Europe, especially as we advance to the table-lands. But this law is reversed in ascending steep and rugged mountains. At Keswick, in Cumberland, it amounts to 67¼ inches, while in Essex it is only 19½ inches. Also upon our western shores the quantity of rain is treble in quantity to that which is found to prevail upon our eastern coast. This arises from the westerly winds traversing the Atlantic, whilst the easterly winds come over large inland tracts of the continents of both Europe and Asia; consequently whenever strong easterly winds prevail in the spring months, the weather is generally cold but dry; but as dryness is suitable to cereals, they advance with far greater rapidity as soon as the weather becomes mild, with showers from the west. It frequently happens, however, that but little rain accompanies the westerly winds in the early portion of June; and whenever such is the case, the season is invariably auspicious and congenial to production.

FARM-SERVANTS AND FARM-HORSES—TWO RECENT CASES.

Few men achieve any great success in an occupation that they have not some pride and pleasure in pursuing. It is a feeling that with us all should be especially encouraged. From the day a lad joins a class at school, to the time he sets up for himself, there should never be wanting such an ambition to excel. It is not only our children, however, we should endeavour to imbue with this becoming spirit of emulation and improvement. There are others under our control, who may profit both them and ourselves, equally by this same inward prompting. A servant who does not pride himself on his work and his tools is seldom worth much. It is in suchwise, in fact, that you gather the best evidence of his character. The gardener shows his flowers and fruit. The butler plumes himself on the condition of his wine and the arrangement of his cellar. The cook sends up a soup that will not even submit to another pinch of salt; while neat-handed Phyllis' plate looks as well as if you kept forty servants instead of four. But, if there be one who, above all others, has a real gratification in doing well what he does at all, it is the horse-keeper. No matter whether it is the be-wigged and be-plushed coachman of "the great people," the hobby-de-hoy who look after his first four-wheeler, or the carter who brings his team to market—as a rule,

> "No mothers or nurses
> Take more care of their babes than they do of their horses."

It is rarely indeed that such a man forgets his charge. The groom at the covert side daintily wisps his horse over with his own silk handkerchief; the drayman's "filler" would seem to get more stout even than his driver; and the veriest man-of-all-work thinks of "the nag" long before he does of himself.

It is a pardonable and almost a national pride we have. But it may be carried too far; in instance of which we may briefly tell two histories that have been brought especially under our notice. They may act as something of a caution with the one class, and at the same time as something of a plea with the other. There farms, then, at Westdean, in Sussex, one Mr. Thomas Newman, who, until very recently, had in his employment two men of the name of Gabriel. The elder of these had been in this same service for so long a period as fifteen years, and never, according to his master's testimony, had he in that time robbed Mr. Newman "of a sixpence." This is something of a character at any rate. The other man, a son or brother most probably, does not appear to have been settled here so long; but we will assume that he did not disgrace his relative or his place. In an unhappy moment, however, these two men have sacrificed every thing. They stand as convicted thieves. The constables are sent for. They are taken to prison, and in due course before the Bench of Magistrates. The prosecutor would seem at last to have even pleaded for them—for the elder particularly, "who had been fifteen years in his service; never robbed him of sixpence; had a large family, and a wife very ill." The Chairman of the Bench himself admitted that "they had erred more from ignorance than any dishonest intention; they had not, it was clear, appropriated anything to their own advantage." Still the law must be enforced, and the two Gabriels are sentenced accordingly to three weeks' imprisonment each in the Petworth House of Correction.

And what have these unfortunates, who erred more from ignorance than intention, been doing? Stealing tail corn for their pigs? Or getting a few apples out of the orchard for their children? Or making love to Betty the maid, and getting beer and bacon for themselves? No. A man with fifteen years' character is scarcely as selfish or as culpable as this. The Gabriels had been robbing Mr. Newman of his oats—to feed his own horses with; or, as it is written in the local report of the case, "it came out that the men had taken the oats without their master's permission, to give to their horses."

No question they did wrong. No doubt Mr. Newman should not suffer from having his horses over-fed and his corn wasted. But, surely, justice in such a case might be tempered with mercy! "Not a sixpence" ere this had Mr. Newman lost by an old servant with a bond of fifteen years between them. It was clearly, then, a first offence. And was it worth while for a first offence, and such an offence too, to destroy this fifteen years' acquaintance, and drag off poor Gabriel from his family and ailing wife to Petworth gaol? "To be branded," a correspondent writes, "as thieves, and to associate, as I suppose, for three weeks with thieves, to the great injury of their own morals and future self-respect, the greatest safeguard against crime." "Did these poor men," we must quote him yet further, "imagine they were guilty of a worse act than a servant (with far more opportunities of self-improvement) would admit of, who had cut off a slice of meat from the joint for the cat? Or taken the dripping as her perquisite, not to minister to her master's good, but to buy finery for herself?"

We tell this story more as a caution to the farm-labourer than anything else. At the same time we are bound to confess that it sounds unusually harsh; and we believe that few farmers under the circumstances would have proceeded to such extremities. The result of such a course can only be irreparable injury to all concerned. It was but on Monday evening last that we heard a member of the Central Farmers' Club speak to the value of mangel wurzel as food for sheep and pigs. He had only found one difficulty associated with its use, and that was, the men would over-feed with it. Now, did Mr. Stagg ever dream of giving his shepherd or yard-man into custody for taking too many mangel? And, if not, why not? Did not the shepherd take mangel for precisely the same purpose the carter did oats? There is a nice line to draw here, but no wise man will draw it too finely.

The other case which arose from exactly the same cause, the man's pride in his horses, occurred on the farm of Mr. Ibbott Mason, at Somersham in Huntingdonshire. The ploughman here secretly administered drugs to his horses—antimony amongst other things—with the notion of making them look better, and which he had openly purchased of a chemist in the village for that purpose. Three good horses died from the effects of this. The veterinary surgeon declared on examination they had been poisoned. The mixture was found in his stable. And, indeed, the man at once admitted what he had done. The injury in this instance was, of course, of a far more serious character; but the magistrates could see no malice in the case, and as the man had only erred from ignorance, he was acquitted. At Chichester the chairman went so far as to tell the Gabriels they too had erred from ignorance. The law, however, in this instance, took a different complexion, and they went to gaol for feeding horses, while Mr. Mason's man gets no punishment for poisoning them. We do not go so far as to say he should; the druggist certainly appears to be the more culpable of the two. What we do wish is that we should have had no occasion to make the comparison. A man who has absolutely lost so much valuable property as Mr. Mason did, must, as a moral duty, institute some public inquiry; but need we sacrifice an old servant for a sieve of corn? Surely a reprimand might for once at least have been sufficient?

The more general publication of these two cases may be useful to both master and man. We counsel the former to let his labourers have the opportunity of seeing them.

THE FARM-HORSES.

In order to include the fullest and most comprehensive view of this subject, I shall first consider the extent of the arable portion of the farm best adapted for economising the labour of the farm horses; as, however desirable and beneficial it is to combine grass and arable lands together in laying-out a farm, yet, so far as the farm horses are concerned, it is only with the arable portion thereof we have now chiefly to do.

The results of great practical experience in most parts of the kingdom have demonstrated, that the efficient culture of about forty acres of loam, strong loam, loamy clay, or clay soils, will require the power of two good farm horses, such lands being kept under cultivation, and not subjected to the prescribed courses of husbandry usually adopted on light soils. On these soils, where the four-course or other shift is adopted, the same experience has demonstrated that a pair of active horses will suffice for the efficient working of at least sixty acres, because, as one-fourth, or more, is under a seed crop, there remain but forty-five acres, or thereabouts, for the pair to cultivate; and the land being lighter in quality, is worked with less labour proportionately, and will allow a sufficient margin for a little extra cartage of clover, hay, &c., from the seeded portion of the farm. It will also be found, from the results of the same practical experience, that the various kinds of farm-work, such as cartage in harvest-work or in manuring land, requiring a continuous succession of loads, or in any work requiring a relay of horses; or in seed-time, so that the harrowing and drilling go on simultaneously; or in turnip sowing, so that the manure is deposited and ploughed-in immediately—I repeat, it will be found that not a less number than six horses can, on by far the great majority of farms, keep up this continuous succession of general labour so as not to impede the regular farm-work; but with this number of horses, and the free use of one-horse carts, the various kinds of cartage may be economically performed: and, with good management, also all the other various kinds of farm-work may be carried on without let or hindrance. I hold it to be of great importance that this should be the case. The ploughman must not wait for the dung-cart, nor the stacker for the harvest-cart; but all must proceed regularly and in order together.

In accordance with this statement, it will therefore be seen that the farm should not contain a less quantity of arable land, of a strong texture or character, than 120 acres, or of light land not less than 180 acres, respectively; but the larger, in moderation, the more economically can it be managed.

To conduct the farm, then, most profitably, because most economically, we require it to be of the extent, at least, named above; and to work it properly, we require six useful farm-horses. What kind shall we select? How shall we procure them? What course shall we pursue to keep up the number? It will be foreign to our purpose at this time to enter upon the distinctions and qualifications of the various breeds of farm horses; I shall merely take this general rule—to select powerful draught horses for the heavy-land farm, and light draught horses for the light-land farm; *i.e.*, the large Lincolnshire, Cleveland, or Clydesdale horses for the heavy land; the Suffolk Punch, the Norfolk, and other lighter breeds of cart-horses, for the light lands: these will amply suffice. The usual course to be pursued, in making this selection, and procuring them, is to attend the most popular horse-fairs in their respective districts, and to pick up individual specimens as required. Another mode is, to attend the various farm sales within any reasonable distance, and purchase such as are suitable. In the latter case, many admirable animals may be found; indeed, it is almost the only way to obtain first-class mares for breeding purposes, as few farmers will sell their best brood mares at any price. To keep up our stock of farm horses, it will be right to include both horses and mares in our selection, and the proportion should be four horses to two mares; the latter to be chosen with a view to breeding. If more mares are taken on to the farm, it may occasionally put the occupier to inconvenience, as in the event of all of them producing foals in one season, the necessary rest they would require of course impeding the farm-work; hence two would be found to breed a sufficient number of young horses to keep up the farm stock or supply, and for the occasional sale of a cart colt—generally a valuable animal, and ever in demand. I name this as a general rule; but as we cannot expect to obtain just the farm we want, either in extent or proportions of arable or pasture lands, the number of horses required will vary accordingly; and the extra number should, I think, consist of a larger proportion of mares than horses, because if the mares are not at all times fully required in farm work, they may be profitably employed in breeding, and there are certain seasons when they may be much better engaged suckling their foals than in the work of the farm; moreover, in busy seasons, and when the farmer is hard pushed for help, a little light work in cartage or the like, so as not to over-work or over-heat them, will do them or their foals very little harm, but foals should not partake of feverish milk.

Another very important part of this subject is the age of the horses we would select. I think they should invariably be young, or from two to six years old, and care should be taken to ascertain that they are sound, and good workers. Occasionally older horses may be purchased; indeed as respects "brood-mares" it will be found desirable; and as I have before said, they are generally best obtained at farm sales; and in such case a good mare must not be missed because she is a year or two beyond our prescribed limit as to age. It is but seldom that really good and valuable cart-mares for breeding purposes are exposed for sale in the open market or fair. Every farmer has his pet mare. I would on this point also suggest that it is always desirable to have at least one horse on the farm qualified for riding or driving, or as an occasional plough-horse: this might constitute an extra horse for any emergency.

HORSE-TAMING.

The *Boston* (United States) *Journal* has the following article on Mr. Rarey's system of horse-taming:—"We saw Mr. Rarey in this city some two years since, and had a long and interesting conversation with him in regard to his peculiar mode of subduing wild and vicious horses. Mr. Rarey is a small and rather spare man, the only peculiarity about his person being a very keen blue eye. His method of managing a vicious animal entirely precluded the use of force or fear, and he represented that his power was obtained solely through certain herbs and drugs, first subduing the desire of the horse to injure him, and then by inspiring the beast with affection and confidence, he is enabled to do whatever he chooses with him. These herbs and drugs are perfectly harmless, and as Sir Richard Airey says, 'there is nothing in the treatment but what any horseman would approve of.' Mr. Rarey did not communicate his secret to us, but we have no doubt his treatment is substantially the same as that described in the following extract, which has been floating through the papers of this country for several years:—

" 'The horse-castor is a wart, or excrescence, which grows on every horse's fore-legs, and generally on the hind-legs. It has a peculiar rank, musty smell, and is easily pulled off The ammoniacal effluvia of the horse seems peculiarly to concentrate in this part, and its very strong odour has a great attraction for all animals, especially canine, and the horse itself.

" 'The oil of rhodium possesses peculiar properties. All animals seem to cherish a fondness for it, and it exercises a kind of subduing influence over them.

" 'For the oil of cummin the horse has an instinctive passion—both are original natives of Arabia, and, when the horse scents the odour, he is instinctively drawn towards it.

" 'The directions given for taming horses are as follows:

" 'Procure some horse-castor, and grate it fine. Also get some oil of rhodium and oil of cummin, and keep the three separate in air-tight bottles.

" 'Rub a little oil of cummin upon your hand, and approach the horse in the field, on the windward side, so that he can smell the cummin. The horse will let you come up to him then without any trouble. Immediately rub your hand gently on the horse's nose, getting a little of the oil on it. You can lead him anywhere. Give him a little of the castor on a piece of loaf sugar or potato.

" 'Put eight drops of oil of rhodium into a lady's silver thimble. Take the thimble between the thumb and middle finger, stopping the mouth of the thimble to prevent the oil from running out whilst you open the mouth of the horse. As soon as you have opened the horse's mouth, tip the thimble over upon his tongue, and he is your servant. He will follow you like a pet dog. He is now your pupil and your friend. You can teach him anything, only be kind to him—be gentle. Love him, and he will love you. Feed him before you do yourself. Shelter him well, groom him yourself, keep him clean, and at night always give him a good bed, at least a foot deep.

" 'In the winter season, don't let your horse stand out a long time in the cold without shelter or covering; for the horse is a native of a warm climate, and in many respects his constitution is as tender as a man's.

" 'If you want to teach him to lie down, stand on his left side; have a couple of leather straps about six feet long; string up his left leg with one of them round his neck; strap the other end of it over his shoulders; hold it in your hand, and when you are ready, tell him to lie down, at the same time gently, firmly, and steadily pulling on the strap, touching him lightly on the knee with a switch. The horse will immediately lie down. Do this a few times, and you can make him lie down without the strap.'

"Mr. Rarey has subdued many vicious horses in different parts of the country, accounts of which have frequently been published. Among other cases was that of a horse in Washington, which could not be handled. Under Mr. Rarey's tuition, in an hour and a half he made the horse so gentle, that he rode it down the open street without a bridle, beating a drum while seated on his back."

AGRICULTURAL BUILDINGS.

Sir,—In preparing an article for the columns of your widely-circulated Journal, one feels considerable delicacy in generally advocating or condemning any particular system, as the exceedingly variable character of the soil and climate of Great Britain, as well as the general contour of the country, render necessary a great variety of customs and systems of husbandry. But there are certain standard axioms in agricultural economy, as well as in every other science, applicable to all circumstances, and to be observed under every variation of soil or climate. Who, for instance, would doubt the necessity and propriety of draining wet or retentive soils, wherever they might be situated? But who is so absurd as to advocate a system of either deep or shallow draining as being applicable to every description of soil? or who will doubt the propriety of a rotation of crops? Who so unwise as to advocate the same rotation as being suitable for every district? The places of the luxuriant wheat and mangold crops, upon the calcareous flinty soils, and beneath the dry climate of the East of England, are occupied by the verdant pastures, the bulky oat, and rich alimenting turnip crops of the loamy soils and humid climate of the West. It is from being impressed with such feelings as these, that I feel a nicety in taking up the question of Agricultural Buildings in your widely-circulated Journal; for, whilst I feel convinced that all will agree with me in saying that substantial, ample, and commodious premises are of paramount importance to agriculture, I am at the same time aware that, within the precincts of the circulation of your Journal, a diversity of opinions will be found as to the amount of accommodation requisite, and the best method of arrangement. The long and severe cold of a Scottish winter renders it imperatively necessary that more ample and comfortable accommodation be there provided for the stock, than may suffice in the more mild and hospitable climate of the South. If I were to assert that this important attribute to successful farming is overlooked by *all* landlords, or neglected in *every* part of the country, I should be making an unwarrantable assertion; but if I say that few landlords attach to it that importance which it demands, and that the great mass of agricultural buildings throughout the country are in an unsatisfactory condition, I feel that I am making no rash assertion or uncharitable remark.

It is not my intention, upon the present occasion, to enter into the minutiæ connected with the erection or arranging of farm-buildings; but merely to throw out a few promiscuous remarks bearing upon the subject generally, and to press the importance of a much greater attention being paid to Agricultural Buildings, than in many parts of the country they have hitherto received. Next to long leases (and the one is almost a certain concomitant of the other), there is nothing more calculated to aid in promoting good husbandry than ample farm buildings. It is very possible that bad farming may be found where such premises exist, but good and successful farming can never be carried on with scanty and dilapidated buildings. Where the necessary shelter and warmth for stock are wanting, much of that nutriment which should tend to improve the animal is spent in maintaining that necessary degree of warmth which a comfortable lodging should supply, and the inroads of disease and death become more frequent; and, with insufficient accommodation, much loss and inconvenience is sustained. Implements must remain unprotected from the weather, a due regard to manure is often prevented, and even a full development of the resources of the farm is often rendered utterly impossible, or when the arrangement is inconvenient, much loss of time and additional expense in labour is involved. It has been computed that to have the steading conveniently placed with regard to the land, will upon a farm of considerable extent increase its value from one to five shillings per acre, and that an ample and convenient arrangement of the buildings will diminish the amount of labour and loss, &c., upon a similar farm to the amount of from £50 to £100 per annum. Theory at once points to the centre of the farm as the best site for the steading; but here, as in many other instances, principles must often give way to circumstances, and proximity to a good road, an ample supply of water for general use, or its acquirement as a motive power, are considerations to which proper weight ought to be attached in selecting a site for a farm steading. When the buildings are placed at an extremity of the farm, the expense of labour must then be raised to a maximum, and much loss and inconvenience experienced; the farthest fields are generally neglected for want of manure and their due amount of cultivation, and to erect off-premises for the accommodation of distant fields is a very slight mitigation of the evil, if indeed any at all; it is only incurring additional expense in erecting and maintaining extra premises, and after all attended with many inconveniences. Misplaced farm buildings are very frequently to be met with in several of the eastern counties of England; and, although I am not at a loss to assign reasons for the neglect of this important point, still I see no real cause why more active and energetic measures should not be taken to remedy an evil so prejudicial to successful agriculture. One would have naturally supposed that in a level country, intersected by excellent roads, there could exist no pretext for misplacing farm-steadings, and that they would be found planted down with almost mathematical accuracy. Quite the reverse, however, is more frequently found to be the case; and I believe the origin, as well as the continued existence of the evil in the counties just mentioned, is to be traced to some or all of the following sources, viz.; small parishes, glebe lands, charitable bequests, copyhold tenure, commons, yearly tenancy, and an indifference on the part of landlords. It may be thought that some of these can in no way interfere with farm-buildings. I consider however that all, more or less, have had, and still do exert, a baneful influence, both with regard to the choice of a situation and the provision of commodious and ample arrangements. By the intersection and cutting in of glebe lands, some farms are so detached that it would be impossible to point out a central situation; and so much negotiation is required with the lord bishop, the rector, and attorney, that few are bold enough to encounter the troubles involved in an exchange of their lands. Commons, too, whether as common or divided, produce the same injurious effects; and where parishes are small, glebe lands, commons, and small patches are generally found more numerous. Lands belonging to charitable bequests also, being generally inalienable, have a like prejudicial tendency to mar the compactness of farms, and to preserve the boundaries of fields upon which they, in common with glebe lands, &c., abut in that crooked, irregular, and unworkable state, so fashionable in the days of our forefathers, and for whose wisdom in this respect we are quite at a loss to account. The serious annoyance and interruptions to the managing and improving of landed property from copyholds, manifests itself in a variety of ways, well known to manyby dear-bought experience; but we look forward to almost an entire abrogation of this evil through the instrumentality of the Enfranchisement Act.

Then comes yearly tenancy exerting the same evil tendency upon the melioration of farm-buildings that it does upon every other agricultural improvement. Its uncertainty encourages a system of patching; it renders it necessary for the landlord to undertake the *onus* of keeping the premises in repair himself, so that there is a constant patching-up, always doing, yet never done. With some tenants a carelessness gradually steals on, whilst others will have temporary conveniences, if they should be at the first expense themselves, and for some part at least they look forward to being paid by valuation by the in-coming tenant; and to such an extent has this got in some instances, that it is difficult to know what part of the premises belong to the landlord, and what is claimed by the tenant. But in those parts of the country where long leases have been a long-established system, repairs are generally thrown upon the tenant, and this item, duly taken into consideration by him in offering for the farm; but of course he does not accept of the premises in that insufficient and dilapidated state which satisfies the yearly tenant. No; before making his bargain he thoroughly examines their condition, stipulates what he considers necessary to be done, gets everything put in good and substantial condition, agrees to maintain them so during his tenancy, and to leave them habitable and tenantable at the expiry of the lease, under a penalty for non-fulfilment. Thus new buildings are erected by the landlord, and kept in repair by the tenant, who, being always on the spot, and using them, is certainly, under a proper agreement, the most suitable party to be entrusted with this duty. Indifference on the part of landlords has also in many instances proved a great barrier to efficiency in Agricultural Buildings. It must, however, be gratifying to all interested in the prosperity of agriculture to observe the lively interest which the nobility and landlords of England are now evincing in the cause, and under their patronage I feel convinced that nothing requisite to promote her progress will be overlooked; landlords will no longer look upon money properly applied in erecting ample and substantial farm-buildings as being thrown away, nor consider it any economy to withhold from their tenants any accommodation requisite for the proper cultivation of their lands, nor request their tenants to erect at their own expense a temporary and beggarly-looking faggot-shed, which at the best can only afford half shelter to the starving kine. No: landlords are now awake to the fact, that, to carry out successful farming, warm, well-ventilated, and ample accommodation for the stock must be provided; that upon occupations of ordinary extent machinery must be fitted up, and steam or water-power applied to perform with economy and expedition the various operations to which it is applicable.

And, finally, let us not forget the condition of the labourer, setting out perhaps upon a journey of some two miles before reaching the scene of his labours, and after being heated to perspiration, or wetted by the drizzling rain, he sits down in a cold out-house, or under the shade of an aged tree, to partake of his cold and scanty fare; tired and weary with the labours of the day, he again sets out upon his homeward journey. This must produce its effects somewhere. A full day's work cannot be got; and premature old age must soon consign him to some union workhouse. But the remedy is obvious. Erect cottages, at least for the horsemen and stockmen, at some convenient distance from the steading, where the labourer will be at all times near to, and ready for, his work, and sit down to his meals with comfort by his own fireside. He will be free from the contaminating influences of a village population, and the corrupting effects of the alehouse.

Such, Mr. Editor, are a few of the ideas which have suggested themselves to me upon the subject of Agricultural Buildings. Some of the evils I have mentioned may be unknown in some parts of the country, but most of them will be found to exist more or less in almost every district. A proper description of skill has yet scarcely been brought to bear upon the subject. The "old estate carpenter," and the majority of farmers, have as yet little idea of arranging a farmery consistent with the requirements of modern machinery, and the principles of improved husbandry. In most parts of England they still adhere to the old system of erecting a great barn in the centre, with a few sheds and lean-toos huddled around; whereas the architect who, under the encouragement of some nobleman, has brought to bear his scientific skill upon this subject, has generally gone to such expense with useless and ornamental fancies, that a poor rate of interest can only be obtained for the outlay; and for this reason the man of calculation at once sets it aside as impractical. Nothing ornamental is required, but everything that tends to good arrangement and substantiality; and this being kept in view, an outlay on agricultural buildings becomes a profitable investment.[*] There can be no reason why the establishments in which are manufactured the staple commodities upon which the millions of Great Britain are fed should not be conducted and arranged in that same orderly and systematic style which characterizes the manufacture of the fabrics with which they are clothed. The subject well deserves attention. Agriculture, as the sinew and backbone of British industry, requires the removal of every impediment calculated to mar her progress; and, looking to the British legislature, she requests their interference, by affording every facility to the exchange of lands, and the straightening and adjusting of boundaries between adjoining proprietors, by rendering it compulsory upon the one on demand of the other, upon fair and equitable terms. The introduction of steam ploughing, and other modern implements, must ere long demand this alteration, for it is utterly inconsistent to suppose that the whims and crotchets originating, and perhaps necessary, during the dark ages of feudalism should still be allowed to exist, to impede the progress of enlightened civilization. Yours, &c.,

WM. ARNOTT.

Melton, Woodbridge, 16*th Feb.*, 1858.

THE GREAT OWNERS OF THE SOIL IN IRELAND.

SIR,—I have understood from the highest authority that Ireland, take it all in all, is the finest country for land under the sun, but it has been greatly neglected in the cultivation of it. Let the owners of the land in Ireland give the cultivators of it a tenant-right, *alias* justice, for money laid out in unexhausted improvements upon their farms, and then it would tempt a vast number of first class farmers from England and Scotland to cultivate well the ill-used Irish soil, and would soon cause the 4,000,000 acres of waste improvable land in Ireland to be brought into a high state of cultivation, which would be a fine example to all the world, there being in Ireland 2,380,000 acres of bogs, all drainable, all improvable.

SAMUEL ARNSBY.

Mill Field, Peterborough, Feb. 24, 1858.

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[*] The best models of agricultural buildings to which we can refer are to be found in Lincolnshire, and the more northern counties of England, and generally throughout the best agricultural districts in Scotland.

TO THE COUNCIL OF THE ROYAL AGRICULTURAL SOCIETY.

Gentlemen,—We, the undersigned exhibitors of steam-ploughs at Salisbury, are of opinion that the trial of those machines at that meeting was of an unsatisfactory character, and not such as was calculated to develope their merits, but rather, by putting them into exceptional circumstances, to injure them in the eyes of the public, and was not consistent with the importance of the subject, or a fair return for the large outlay incurred by us in exhibiting them there.

As the third offer of the Society's premium has again brought the subject under our notice, and as we cannot but think that the withdrawal of those schemes at present most prominently before the public from competition would be prejudicial to the progress of the invention, and would greatly detract from the interest of the Society's meeting at Chester, we would respectfully request that the Council would consider whether such terms and conditions of trial could be arranged and published previous to the day of entry as would enable those intending to exhibit to judge of the advisability of their incurring the heavy expenses necessary to such a competition.

As we observe that the judges, in their report of the trial at Salisbury, express the opinion that "the wording of the premium can never justify a judge in giving a prize whilst a plough is used," it is, we think, essential that it should be clearly stated whether any or all those plans which we represent are excluded by the wording of the offer of the premium from competition.

We would also suggest that to ensure such a trial of these machines as the importance of the subject deserves, a much longer time is necessary than can be given during the show week by judges who have a great many other duties to attend to, and that it would be of great importance that the judges of this department should have their whole time at their disposal for this subject, as no fair comparison with horse labour can be instituted except by lengthened trial.

The length of time that elapses before the publication of the judge's report and the adjudication of the prize also exercises a very prejudicial effect on the business to be done at the meeting. So much so, that, in our opinion, a machine known not to be competing for the premium, stands a better chance of obtaining orders on its own merits than one upon which a report is expected in a few months, and for which the public are likely to wait.

As, in the opinion of the editor of your report on Salisbury meeting, no adjudication need necessarily take place for some years to come, we would submit that there is not much inducement held out to us at present to compete at the next meeting.

If the Society would conclude not to offer the prize, but to expend a portion of the sum offered in a careful investigation of the individual merits of each machine, to be published in a report previous to the meeting, we should hail such a result with pleasure; but failing this, we would very respectfully request:

1st. That an explanation be given of the wording of the prize.

2nd. That arrangements be made for an extended and careful trial, and an immediate publication of the report of the judges.

3rd. That the adjudication of the prize should be fixed to take place, if possible, at a special council meeting during the week of the show, or at latest at the meeting of the council in August.

Collinson Hall, Sen., Princesgate,
Navestock, Essex.
John Fowler, Jun., 28, Cornhill, London.
Charles Burrell, Thetford.
John A. Williams, Baydon.

INFLUENCE OF EDUCATION UPON THE CULTIVATION OF THE SOIL.

Sir,—What sculpture is to a block of marble, education is to the human mind; the figure lies hidden in the stone, and the sculptor finds it: out of the rough stone he cuts a handsome figure. Education to the British farmer is a great accomplishment, useful, profitable, and ornamental; it teaches him how to calculate and to think for himself how he is to get his land the best cultivated at the least expense, and to know the value of labour upon a farm; nay, what ought to be performed by a certain number of men, horses, and oxen, in a given time. The more you educate the farmers the better the soil in England will be cultivated. Education leads a farmer to make hot land colder, cold land hotter, light land stiffer, and stiff land lighter; as in the Lincolnshire peat or fen land, for instance, where they mix the peat with clay, to make the peat stiffer. Education has brought forward all the new agricultural machinery, which has struck every enlightened farmer with admiration, and amazement to think what will follow. Half a century back a vast number of farmers required more cultivation than their ill-farmed lands, many of which grew more weeds than corn; nay, their land was half ploughed, half manured, and half cleaned in the weeding season. A niggard in labour is always a bad farmer. For the want of education agricultural chemistry is so little known amongst farmers, that many are greatly imposed upon by adulterated artificial manures. A more extensive acquaintance with the valuable articles which so frequently appear in the leading agricultural journals would enable every farmer to combine "science with practice."

Mill Field, Peterborough, Feb. 3. Saml. Arnsby.

OXFORD FARMERS' CLUB.

The Monthly Meeting of this Club was held on Wednesday, March 10, in the Committee Room at the Star Hotel, when about fifty members were present.

The President (Mr. W. Thomson, of Culham) occupied the chair, and was assisted by the Vice-President (Mr. James Walker), of Begbroke Hill.

DRILL v. BROADCAST.

Mr. James Williams, of Northcourt, expressed his regret that he should have disappointed the members in not bringing forward his subject at the last meeting, but at that time he was confined to the house, and could not attend; he thought, therefore, that the best apology he could make was to introduce it at this meeting. His attention had been drawn to the subject of depositing the seed of corn crops in the land in consequence of an article in the *Mark-lane Express*, in which the writer condemned the drill system, and advocated sowing broadcast. He (Mr. Williams) had used the drill for many years, and was satisfied that it was the best mode of depositing the seed-corn in the land; but, as others might differ with him upon that point, he was desirous of eliciting the opinion of this Club upon it. Mr. Williams then noticed the difference between the cereal and the leguminous crops, and showed the analogy which exists between the animal and vegetable creation. He then traced the history of the cultivation of the soil, and the modes adopted for depositing the seed in the land, from the time of the Goths down to the period of Oliver Cromwell, who laid the foundation of a different state of things, and when artificial grasses and turnips were introduced. He then noticed the system introduced by Jethro Tull, and the success which had attended it. Mr. Williams then entered into a variety of details explanatory of the modes of sowing broadcast, drilling, and dibbling, and said that he could come to no other conclusion than "That, as a general rule, the best mode of depositing the seed of corn crops in the land was by the use of the Suffolk drill," which he moved as a resolution..

Mr. John Price, of Glympton, seconded the resolution.

Mr. Wing concurred with the resolution, with some qualification.

Mr. Watson spoke in favour of the drill system.

Mr. J. P. Field agreed, on the whole, with Mr. Williams, but considered that in hilly districts the drill could not be applied, and that dibbling by Newberry's drill, a very valuable implement, was preferable.

Mr. Middleton preferred beans put in by hand to the drill, and said that, as a general principle, the Suffolk drill was the best, but not as a universal one.

Mr. Coggins spoke in favour of the drill over broadcast.

After a few remarks from Mr. Osborn and the President,

Mr. Williams replied upon the whole question, and his resolution was then carried unanimously.

The discussion occupied some hours

PATENTS TAKEN OUT FOR THE APPLICATION OF TOWN SEWAGE.

In a recent number of our Journal appeared a *resumé* of the patents which have been taken out, from the earliest period up to the present time, under the head of "Drain Tiles and Pipes." We now propose to give a similar *resumé* of patents relating to manures. For the present, we shall select for notice those only which have special reference to *town sewage and the fœcal matter of our town population, their deodorization, and utilization as manures available for agricultural purposes.* And this narrowing of the subject—leaving the consideration of other manures to a future article—we are the more inclined to follow, as our remarks will be usefully introductory to, or elucidative of a review of two official reports which have been recently presented to Parliament bearing closely on the question of the disposal of our town sewage. This review may be comprised in one or two articles which we hope shortly to present to our readers.

To proceed with the immediate subject of our present paper, we find that the first patent having direct reference to town sewage was granted to Lewis James Armand Estienne, Jan. 9th, 1802, for converting "human excrement into a powder divested of all smell, preserving at the same time all its fertilizing properties." This was effected by gathering it into tanks, and allowing the liquid matter to be drawn off. The solid matter thus obtained was next dried in the sun, either mixed or unmixed with lime. It was next stowed away in heaps under a shed till it attained a temperature of 212 deg. Fahrenheit; it was finally crushed into a powder, which went into small compass. [No. 2,570, price 7d.]*

The next patent, in chronological order, was granted to Joseph Hehr Jerome Poitevin, July 17th, 1835, "for preparing a powder which is applicable to the purposes of disinfecting night-soil and certain other matters, and facilitating the producing of manure." This powder he obtained by calcining, when properly dry, mud of rivers or ponds, which contained animal or vegetable matter, capable of producing carbon by calcination. Where earths did not of themselves contain these matters, they were added previously to calcination.

On Aug. 10th, 1842, a patent was granted to Dominic Frick Albert, for a "manuring powder." This was obtained by mixing in certain proportions a number of substances together, as the ammoniacal liquor from gas works, the spent urical liquor in the scouring of woollen cloths, all sorts of animal refuse, cotton waste impregnated with oil, and, in fact, the refuse of nearly all our manufacturing or chemical processes. [9,442, 4d.]

June 23rd, 1845, is the date of a patent granted to Michel Antoine Bertin Burin der Buisson, for new and improved methods for the distillation of bituminous schistus and other bituminous substances: the mixing of some of the products of distillation with the residual ash in the retort, yielding a manure, the azote in which, the patentee stated, was considerably increased by allowing it to absorb fresh or coagulated blood, or any other soft animal matter, such as night-soil or brain, or liquid, such as urine. [10,726, 1½d.]

William Higgs, April 28th, 1846, obtained a patent for constructing tanks or reservoirs for collecting town sewage, and for solidifying and drying the solid matters therein contained. The patent also included buildings to be erected over these tanks, in which the gases evolved from the sewage were collected, and treated with chemical agents—the salts resulting from which crystallized or rested on spars or bars peculiarly arranged. Machinery and apparatus were also secured to the patentee for distributing and depositing chemical agents over the mass of sewage in the tanks. A fourth claim was for chemical agents for precipitating the solid matter in the sewage, and for absorbing and combining with the gases evolved from it, and with the solid matters precipitated. The substance used by the patentee to precipitate the solid matters was "hydrate of lime, commonly called slacked lime;" chlorine gas being used by preference, to condense or combine the gases evolved from the sewage, although hydrochloric acid gas is mentioned by the patentee as also useful for this purpose. [11181, 10d.]

The date of the patent granted to Edward Brown for "disinfecting fœcal substances," so as to preserve them in order to be manufactured into manures, was Feb. 20th, 1847. The substances stated to be employed for this purpose are, the "sulphate of iron, or the chlorides of sodium (sea salt), or of iron and manganese, or the nitrates, sulphates, and chlorides of lead, copper, zinc and tin, or pyroligneous acid, or the pyrolignites or the mother-waters arising from the manufacture of any of the before-enumerated substances, or coal tar, or schistous and bituminous extracts." The patentee also claimed the making of fœcal matters into manures by mixing them with an "absorbent powder." This was made by incinerating in closed vessels "coal or wood ashes, and earth, or street or road sweepings, and vegetable, animal, and mineral rubbish, such as sawdust, bone dust, and the waste matters of commerce, cotton mills," &c. [11,587, 4d.]

William Bridges Adams and Robert Richardson obtained, on May 24th, 1847, a patent for constructing at railway stations, close cisterns of slate, &c., into which the urine was designed to drain, and for using chemical ingredients to absorb the volatile alkali and other gases. [11,715, 2s. 1d.]

June 1st, 1848, is the date of the patent granted to Jasper Wheeler Rogers, for improved methods with machinery for the preparation of peat as a fuel, and in combination with certain substances as a compost or manure. For the latter purpose the peat-charcoal was to be added to animal excrement, in such quantities as to absorb the aqueous and volatile products, and to destroy the effluvium. [12,169, 2s. 5d.]

A patent was granted September 27th, 1849, to John Marriott Blashfield, for manufacturing manure from mud, by subjecting it to artificial heat, treating it with an acid, and embuing it with other fertilizing matters, these latter consisting of quick-lime, gypsum, sulphate of soda, nitrate of soda, or potash, &c., &c., these being ground to powder before being mixed with the mud. Sulphuric and nitric acids were employed. [12,790, 3d.]

The date of the patent granted to Louis Napoleon Legras was November 30th, 1849. The claims were very numerous. One had reference to the construction of water-closets, in which the solid matter was separated from the liquid. Another claim was for a vast number of substances to be used for disinfecting fœcal matters, and another for making a manure "resembling guano in its fertilizing qualities." This consisting of

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* The number and price within brackets give the No. of the patent and its cost.

"bestial dung, road-scrapings, or street-sweepings, marl, fœcal substances, the residuum from the manufacture of schistus, or of peat, or wood-charcoal ground to powder, or of soot, marine salt, saltpetre, alumina, sulphate of zinc, and water," intimately mixed together, moulded into bricks, and dried; after which it is reduced to powder, and spread upon the ground when it rains. [12,869, 4s. 8d.]

A patent for "deodorizing every species of excretive fœcal matter or urine, at the moment when it falls from the body," was granted, June 4, 1850, to Paul D'Angely. The deodorizing substance employed was composed of fresh bark, rue, or wild mint, sulphate of iron, and pyrolignite of iron. The fœcal matter of the deodorization was converted into manure by being dried in a chamber peculiarly constructed, and reduced to powder, and finally mixed with "dried or burnt peat in powder, or with dried beasts' blood also in powder." [13,097, 5d.]

To Thomas Wicksteed, on Feb. 24, 1851, a patent was granted for manufacturing "manure from sewage water." This he effected by mixing it with milk of lime, and drying the precipitated matter by centrifugal drying machinery; by which the whole, or nearly the whole of the moisture was driven off, and the manure remained in a state fit for transport." [13,526, 9d.]

Oct. 16, 1851, is the date of the patent granted to Richard Dover for deodorizing sewage with an acid or acids, and for obtaining certain products therefrom. Amongst other substances, hydrochloric or some other mineral acid, iron filings, and chloride of sodium, are employed. After deodorization the sewage is filtered through charcoal, clay, gypsum, or peat, and is alone, or together with the following material, mixed with refuse animal matters, shale, marl, &c., to form "other useful manures for fertilizing land." [13,755, 5d.]

Henry Stothert, in April 17, 1852, obtained a patent for applying a combination of materials to precipitate the solid parts of sewage to obtain a manure; and also for converting night-soil into charcoal, to be used as one of the precipitatory agents. The materials proposed were "fresh-made caustic lime, sulphate of alumina, sulphate or protoxide of zinc, compound animal and vegetable charcoal, obtained by distilling the precipitated matters of sewage waters, or by distilling night-soil, creosote oil of peat, peat-mould, tanner's spent bark, burnt clay, old mortar, or mixtures of such matters or other matters." [14,073, 3d.]

We conclude the subject by giving some mention of the peculiarities of those granted under the Patent Law Amendment Act of 1852. Under this act the first patent, relating to town sewage, is under date Oct. 6th, 1852, the patentee being William Armand Gilvee, the object of the patent a deodorizing powder, and the machinery or apparatus employed in manufacturing the same. The deodorizing powder is stated by the patentee to be prepared by the "combustion of the detritus of forests, lignites, vegetables, marine plants, or any ligneous substance, rags, and refuse of wool." The carbonized matters thus prepared are reduced to powder, and mixed with wool shearings in certain proportions. The fœcal matter is converted into manure by treating them with "decomposing powder, composed of the following substances, mixed together in certain proportions: molasses of sugar or the residuum thereof, slacked lime reduced to powder, sulphate of iron or zinc, and clayish magnesian earth" [No. 250, price 9½d.]

January 5th, 1853, is the date of the patent granted to William Bardwell, for constructing buildings, in a close chamber, on the basement of which a filter-bed is to be placed; in this chamber trays or shelves are suspended, containing sawdust or other matter moistened with dilute sulphuric acid. The sewage-matter, suspended by this agency from the sewage-water, is to be mixed with other matters, suitable for making manures [29, 8½d.]

Jacques Francisque Pinel obtained a patent, dated March 8, 1853, for deodorizing sewage-water by adding, in certain manner and proportions, sulphate of zinc, potass, alum, chloride of sodium, and sand. The solid matter thus obtained is again to be mixed with waste tan, pulverized chloride of sodium, nitrate of potass, soot, ashes, slacked lime, and muriate of ammonia [581, 2½d].

On March 15, 1853, John Thornton Herapath obtained a patent for precipitating the phosphoric acid and ammonia of sewage, in a comparatively insoluble state, by adding to it magnesia, or a magnesian compound. This addition is to be made at or about the time when the deodorization of the sewage is effected, through the addition of some chemical agent which will not decompose ammonia or its salts; but which, on the contrary, will combine with or absorb hydro-sulphuric acid, such as metallic sulphates, or metallic chlorides, or vegetable carbon [643, 2½d.]

To George Edward Doring a patent was granted, March 28, 1853, for "applying the salts and matter produced in the working of galvanic batteries"—generally treated as refuse, and thrown away—for disinfecting and deoderizing fœcal matters, and to render them available as manures [740, 3½d.]

In the patent dated May 20, 1853, granted to Thomas Isaac Dimsdale, a claim is made for disinfecting sewage and absorbing its noxious exhalations, by the employment of "a peculiar kind of peat-earth containing a salt or salts of iron or oxide of iron." Although no further claim is made specifying the peculiar kind of peat-earth, it is stated in the specification that "this knowledge of peat or bog-earth possessing those properties has led to this substance being very generally employed, particularly in Ireland, where it is a common practice to use peat in its raw state, or air-dried peat combined with ashes and peat-charcoal, to mix with manures, for the purpose of fixing ammonia and other volatile gases which are evolved from them" [1,252, 3½d.].

James Alexander Manning on November 29th, 1853, obtained a patent for "defecating and separating certain matters from sewage." For these purposes he employed "animal charcoal, alum, and carbonate of soda and gypsum." With the sewage precipitated thus, he mixed "waste charcoal or carbonaceous matter of various kinds, kelp, factory waste, common salt, or the refuse brine derived from the curing of provisions—gypsum, or phosphate of lime and horn-dust riddlings." In these operations the patentee used a peculiar form of precipitating vessel, and tanks with inclined bottoms [2,780, 6½d.].

A patent was granted, Dec. 10, 1853, to Allan Macpherson, for purifying sewage and other fœcal matters by using combinations of substances, such as peats of any description, whether in a high-dried natural state, or carbonized, in lumps or coarsely granulated, or finely powdered. Charcoal prepared from sawdust or refuse wood is also named; but peat charcoal is preferred by the patentee. A claim is also made for arresting, purifying, and deodorizing noxious gases in sewers, by placing in chambers made in the sewers, perforated trays or basket-work trays, with a mixture of peat charcoal. Where the sewage is discharged into a river, it is to pass through a barge, placed near the mouth of the sewer, and provided with deodorizing materials placed on gratings. The aqueous portion passes off to the river much purified, while "the contents of these lighters will be found to be a rich and powerful manure" [2,876, 4½d.].

To Robert Angus Smith and Alexander McDougall a patent was granted, Jan. 20, 1854, for improvements in deodorizing and disinfecting sewage by employing, alone or together, a combination of magnesia and lime, with sulphurous acid and carbonic acid, " either in an acid or alkaline state" [142, 3d.]

The date of the (second, third, and fourth) patents granted to Thomas Wicksteed, is January 26th, 1854. The first of these is for moulding the fertilized matter of precipitated sewage into perforated bricks or blocks, in manner similar to that employed in ordinary brick-making—the hollow perforations facilitating the drying of the bricks. The second of these three patents refers to a method of precipitating the fertilizing matter of sewage by mixing it with lime and finely-divided charcoal: the two substances are mixed in water, and a stream of it is made to flow into the sewage-water, by means of a pump—another pump supplying the sewage-water. The third of these patents refers to the construction of reservoirs for the deposition of the precipitate from sewage-water. These are arranged so as to cause an equal flow from all parts, with the exception of a portion at the bottom which receives the precipitated matter. The velocity is regulated so as not to prevent the subsidence of the precipitate. The water is thrown off the precipitate from the bottom of the reservoir into a well by means of an endless screw. The precipitate is raised by means of an elevator or Jacob's ladder, in such a way that the precipitate is raised without contact with the supernatant liquid [192, 3d.; 193, 3d.; 194, 1s. 1d.]

The date of the (second) patent granted to John Thornton Herapath is March 17th, 1854, and it claims the employment of coke obtained from the so-called Boghead coal or Torbane-hill mineral, " either before or after the aluminous ingredients of the coke shall have been extracted by an acid or other chemical." This coke to be used either for drying up precipitated sewage, or using a stratum of it, through which sewage, &c., is allowed to pass or percolate [638, 3d.]

The date of the (second) patent granted to James Alexander Manning is March 27th, 1854; and is for " improvements in the treatment of sewage." The sewage is to be mixed with the "soft sludge" from the alum works: the contents of the reservoir are to be agitated, and during agitation powdered caustic or unslacked lime and animal charcoal are to be thrown in. This alum "sludge" is the deposit during the first boiling down of the rough liquor obtained from alum shales in the manufacture of alum, and which deposit consists essentially of basic and other sulphates of iron and alumina" [709, 3d.].

George Anderson, on December 23rd, 1854, obtained a patent for purifying sewers from noxious exhalations; and this he proposed to effect by using a pump, fan, or other exhausting apparatus, to force the vapours in contact with deodorising materials. The materials named by the patentee are, "lime as used in the gas works, peroxide of iron or other metallic salts, or dilute acids, or acids held by peat, coke, gravel, charcoal, sawdust, or other matter." The product obtained to be used as a manure, or applied to other useful purposes [2,715, 3d.].

The date of the (third) patent granted to James Alexander Manning is August 7, 1855, and is for the employment of " alum slate, alum shale, alum schist, alum ore, and other aluminous minerals and earths, as a precipitatory and clarifying agent for cleansing sewage matters. The method to be employed in preparing the shales is described. In addition to this alum liquor, powdered lime and charcoal are employed. The sewage is stated to be greatly improved in value for agricultural purposes by the addition of the alum shales." [1,786, 3d.]

Having thus reviewed very briefly, the various patents taken out for the deodorization and utilization of our town sewage, we shall be prepared to enter into the consideration of the relative values of manures prepared by some of the processes described, and the chances—favourable or otherwise—of their being employed on the large scale. This consideration we propose to take up, in conjunction with the *future prospects of the application of town sewage to agricultural purposes*, in noticing two important reports recently published, and to which we referred at the commencement of the present papers.

"LOIS-WEEDON" WITHOUT THE SPADE.

Lois-Weedon wheat-growing! How many years has it been known to the public, and how many agriculturists have adopted its advantages? In seeking answers to these inquiries, we have been compelled to reflect that one of the farmer's chief faults is a scepticism in regard to offered improvements, when they involve fundamental changes in his practice; and pioneers in farm mechanics, or discoverers of new systems of husbandry, should have fortitude almost like that of brave Bonnevard, of Geneva, in order to " possess their souls in patience," through years of distrust, neglect, or opposition. Why, can it be believed, the reverend Mr. Smith's pamphlet, detailing his practice, its cost and profit, appeared eight years ago! and he had then sufficient experience to warrant his recommendation of the plan to others; for he had thrashed his third harvest, grown year after year on the same acre of land.

The first wheat crop on the now world-renowned "clay piece" was sown in 1846; yet it was not until November, 1849, that the talented and assiduous cultivator felt (with that modesty characterizing all his works) that he would be justified in publishing his success. Thus prolonged and tedious must agricultural experiments necessarily be! So long has the husbandman, who sows *new seeds* in hope, to wait ere the fruits of his thoughtful ingenuities in preparing the soil, and his prudent nurture of the rising plants, reward him with more than promise! The first harvest was not measured; the second and third gave each thirty-four bushels per acre. With wheat at forty shillings a quarter, and straw at forty shillings a ton (for being grown without manure the straw was sold), the tenant's profit was found and proved to be at least four pounds per acre.

Now, it will be remembered that, in 1849, the general feeling among farmers was that, under the circumstances of the times, it was impossible to grow wheat crops that would pay; and, again, there were a great many unemployed labourers dependent on parish sustenance; and the new method of wheat culture by the spade offered not only profit to the farmer, but to the workmen employment and support. These considerations prevailed upon Mr. Smith to break silence with his simple and attractive " Word in Season;" " impelled," as he says, " in fulfilment of a duty which all owe to their fellows, to make known, I trust not presumptuously, what is no longer experiment, but experience, of a most profitable system of growing corn." When we infer a hasty conclusion from a single experiment, and urge it as a settled truth, we must expect to meet with incredulous and closed ears; but when you have quietly tested a system for three long years, accurately booked, weighed, and measured, and calculated your profit with the certainty of demonstration, it is natural to suppose that the proposal of a simple though novel series of tillage operations, promising so handsomely in a time of despondency and bad prices, would be eagerly caught up, and (with the best kind of gratitude, appropriation, and imitation) at once tried in every province of the kingdom, and applied with ready and clever adaptations to all soils and varying circumstances. Now, Mr. Smith has no "interest" in the extension of his husbandry: he has never pushed it before public attention by any form of advertising, but simply given us annually his most telling, because most truthful, statement of the facts of his management and success; and it must seem hard to him to find only a few instances of Lois-Weedon husbandry here and there, after all these years of advising agriculturists for their own good. However, he has persevered with his own cultivation with the happiest success, and an ample profit; and if others do not choose to venture on the practice, they themselves are the losers. Mr. Smith has *not* been obliged to dig deeper for every succeeding crop; but the last two years' crops have been much greater than the previous average, though the double digging had been discontinued, and the fork worked only 10 inches deep. In fact, there is not one of the numberless objections, scientific as well as practical, raised against the system, that has not been proved untenable. It remains true, that wherever the plan has been found to fail, the rules have been violated—unless we except Mr. Piper's case, about which more particulars are desirable; and we have instances of success to corroborate the original testimony. Mr. Jones, of Lois-Weedon, published the satisfactory results of his practice; and Lieutenant Goodiff, of Granard, in Ireland, also made known the success of his trials on a small scale. In the winter of 1854-5, Mr. H. Dixon, of Witham, Essex, was double-trenching five acres for the purpose; but whether his wheat-growing answered, the world has not yet heard. R. Calwell, Esq., of Belvedere, county Down, tried 14 acres in the year 1854, and extended the breadth to 29 acres in 1855, the first year's crop leaving about £3 10s. per acre over and above the expenses, rent, profit, &c. In 1854-5-6-7 an acre of dry gravelly land near Reading was under a modified form of the Lois-Weedon system; and, though found to yield three quarters annually, would not have been remunerative except for the high price of produce. One or two quarters less than the land would grow in ordinary good culture is of course unsatisfactory; but in this case, some of the most important conditions of management were neglected. Mr. Piper's lately-published results are very unfavourable, as he got only five sacks of corn and half-a-ton of straw per acre; but the details of his management are not at present forthcoming. Lord Rayleigh has grown two acres of Lois-Weedon wheat, near Witham, for five years successively, without manure; the average yield being 44 bushels. Mr. Lawes has made the system fail at Rothamsted on a good loamy soil; but merely, we believe, in consequence of not adhering to Mr. Smith's instructions. We remember to have seen a large field of three-row wheat in Kent, last year. In Lincolnshire we knew a cottage plot under the same system; and last spring passed a field by the road-side where the farmer was rolling his triple rows with the wheels of a cart, the horse walking along the fallow intervals. A spirited agriculturist in Norfolk has for several years grown wheat on a plan much resembling that of Lois-Weedon. On a strong loamy soil he had wheat in triple rows, with a row of potatoes planted in each interval; but this was too troublesome in cleaning of couch, &c. His crops of wheat, with intervals fallowed for bearing wheat the next year, have been very heavy and productive; and there is no doubt they are abundantly profitable. He applies manure besides tilling the intervals; and is so satisfied with the practice (having tried it in portions of many different fields), that this year, we understand, he has sown nearly all his wheat land in three-row stripes. Accurate accounts of work done, and other items of expense, he has not been at the trouble to keep faithfully; but the produce has been so large and obviously remunerative, that his experience and management ought to be described in detail for the example of others. Let us hope he will come forward with a letter or address on the subject.

No doubt many cases of Lois-Weedon husbandry are known to Mr. Smith; but the above list, together with six acres in France, which alluded to below includes all we have yet heard of, with the exception, indeed, of a piece begun last year by ourselves.

In the following extract, have we lighted upon a foreign disciple of the Rev. Mr. Smith, of Lois-Weedon? or a contemporary and independent expounder of Tull's principles applied in the same manner to the culture of wheat? In Mr. Musgrave's "Ramble through Normandy," published in 1855, and describing a tour made in the autumn of 1854, occurs this passage: "While on the subject of foreign husbandry, it is worth noticing the fact that in the heart of Normandy I saw upon land of no very rich quality a heavy crop of wheat grown upon a tract of six acres that had not been 'mended' for nearly as many years. The owner himself occupied it. He was not a needy man; but being a breeder of sheep and a grower of fruit, he laid no great stress upon arable land, and cultivated his grain crop *scientifiquement*. The *science* lay in the preservation of a width of well-tilled unsown intervals of three feet, marking out the corn; and in constant resort to spade labour, which, the wages being low, had, in this instance, superseded the customary employment of horses and ploughs. The horse-hoe, spade, fork, and presser, turning up the clods to crumble, year after year, under the action of winter's wind, rain, and frost, had been followed up by supernal aids in spring and summer; for man having found labour, his Maker had contributed softening dews and balmy breezes, charged, as they must have been, with the treasures of nitrogen, and penetrating deeply the porous soil. Nothing but this winter and summer fallow, under the advantages of depth and constant pulverization, and such aid from the stores of heaven, could, in the absence of all manure, account for the self-same breadth of land yielding successive white crops in the abundance apparent in every part of it.

"I dare say the English tenantry would laugh at the bare mention of land yielding abundantly without manure; and the proprietor's face would lengthen if he surmised his broad acres were held by an occupier that never sent a tumbril of dung into the stubbles. But there is one party in the country who would be only too happy to see the system perpetuated; I mean the labourers, who, being sent on to the ploughed field to trench it with the spade, bury the exhausted top-soil, and bring the lower stratum of fresh soil to the surface, would throw all the worn-out loam to the bottom, and bring clean, fresh, vegetative mould to the surface; the depth and quality of the active soil being hereby wonderfully improved, and the number of hands employed being triple of the average amount of labour. An aid like this to ordinary tillage would reclaim the most unpromising pieces. But, in our variable climate, the process of cultivation must necessarily be expeditious, and two horses can do in one day the work of twenty men. Hence the paramount obligation to use ploughs, and not spades; and to create, through the medium of nourishing agents, the principles of new vegetation: for, as we cannot replace every year as much as we remove from our fields, in the form of produce, and since we exhaust the finest soil by repeated cropping, we are bound to replenish with fertilizing substances, and to bring into operation, by artificial applications, those active elements (hydrogen, carbon, oxygen, and nitrogen) which the Divine husbandry above-mentioned would employ, were large and little farms exclusively cultivated on the principle I have described. The theory is most truthful, and for that reason I have adverted to it; but the practice is impossible, not only in respect of cost, but of the climate; and therefore the healthful and refreshing ammoniacal aroma sent forth from a field well ploughed, harrowed, and manured, in the most approved fashion, will be as acceptable to my critical nostrils as ever."

The author appears to be unaware of Mr. Smith's doings at Lois Weedon, and he seems to imply that this Normandy farmer had practised the system ever since the year 1848 or '9. If so, it will be exceedingly interesting to find that two scientific cultivators, so far apart, should have independently evolved identical methods of growing wheat in rows, and trenching and horse-hoeing the fallow intervals; for, though Mr. Smith began operations in 1846, the methods and results were not made public until the winter of 1849-50. It may be, however, that had the above account been more explicit as to dates, costs, and quantities, we should have found that the "Word in Season," so little heeded in our own land, crossed the Channel and went at once to the heart of this Normandy husbandman, who "cultivates his grain crop *scientifiquement*."

At any rate, we have here a capital corroborative experiment in the Lois Weedon system; and we by no means share in the author's opinion as to the impossibility of carrying out the principle, owing to the great cost of labour involved, and the want of time in our climate to accomplish the digging. Mr. Smith has already progressed a long way towards rendering himself independent of manual spade-work, by his invention of a rotary digger, used in connection with the ordinary plough; and, as we shall relate in another paper, there are other methods of endeavouring to perform the requisite tillage by horse-labour. Let us try to make *traction*-implements suffice; and then we shall not only cultivate with the greatest economy, but *steam* may be employed as the motive power, and machinery be more largely our fertilizer instead of manure.

AN ENGLISH FARMER IN FRANCE.

Sir,—According to promise I will give you my impressions on all here that is novel and interesting to an Englishman. As a farmer of 30 years, perhaps some account of the agriculture may be acceptable to your readers; but I will not confine myself to that alone. I hope I am unprejudiced, and can I possibly find anything worthy of adoption I will not fail to note it. In many parts of England there are many things agricultural, which appear strange to a visitor from a distance, but I make it a rule never to condemn too quickly. The more ridiculous a custom appears the more certain you may be there is some reason in it. In this frame of mind will I view here all I see, and if any of my brother farmers at home find amusement in my homely lucubrations, I shall feel repaid.

First, a few words to any who may like to do as I am doing, viz., enjoying health, amusement, and I may add information, at a small expense. By all means take your passport first. I did not, and so had to go to our Consul here for it; the charge is 5s.; but whatever number form your party one passport is enough. I prefer entering France by Dunkirque, because it is its most northern part; its richest in land, in population, and in manufactures. I went on board the boat at the Tower at 12 at night, by 12 o'clock next day, Oct. 16, I was here. The sea was as smooth as a pond, and the sun as brilliant as summer; the cost 10s. for the boat, and 2s. for the steward. The coast of France in this part is not very interesting, as all the country is as level as Romney Marsh; but still the first approach of a stranger to a foreign part must always excite and interest him. The moment I arrived no doubt could possibly exist that this was not my native land. The men, the houses, even the shipping was so unlike our Thames; one-third of all the men wear a uniform; nothing public can be done without it. Our first acquaintance, of course, are the Custom-house people; there are 175 "douaniers," all dressed like soldiers, with muskets, &c.; the police in green clothes and cocked hats!! and swords; then the 800 soldiers, as a whole regiment, is here always; the priests in black gowns and hats, like our Quakers; the Sisters of Charity; the gendarmes in their most picturesque dresses and cocked hats, looking like the soldiers of Frederic the Great; and all the women, except the highest classes, without bonnets; all these odd costumes make the streets appear to a stranger almost like a carnival. The overhauling of your baggage is soon over, and you go to your hotel. The two best in town charge 1s. 8d. per day for your chamber, 1s. 8d. for the table d'hote, and 1s. 3d. for breakfast; so your expenses you know at once; if you like to stay a month they will do it cheaper. Everything is clean, people attentive, and the beds the best I ever slept in; they are differently stuffed to any in England; even the poorest have good beds of dried leaves. On having arranged your room, you have a cup of coffee and Cogniac, which always join company here, and have a look at the town; streets straight, houses high, rooms all lofty, roads and paths paved alike, most unpleasant to the feet, plenty of public buildings, large churches, and last, though not least interesting, the fortifications, which, of course, now only are of use to enable a small duty to be collected on all eatables and drinkables that enter the town. You return to dinner at 5 o'clock, and find for your two franks soup, fish, meat, poultry, and sweets and beer. Wine is extra. Common red wine, not so good as our cider, 1½ franc per bottle. Cogniac is about 12s. a gallon; and eau de vie, which is principally the spirit of the beet-root, half the money. I like it, and it agrees with me; but it is not considered wholesome. So far my friends would have been here twenty-hours, and have seen the town itself. They would now begin to look at other matters. The first thing that would strike the eye of a farmer is the extraordinary waggons, and mode of attaching the horses to them. The waggons of the town are narrow, very long, and not a foot from the ground: very convenient for the merchandize here. The front wheels are not above 2 to 2½ feet high, with a short axle, to enable them to turn in a small space, as they are altogether in front of the waggon-body. The horse is in shafts, and draws from a bar, like a chaise, to give play to his shoulders; and, except that we are astonished to see one horse draw such heavy loads on such low wheels, the whole thing works appropriate for its purpose. But the country waggons are what excited my surprise: long, narrow, and clumsy; as they are liberal of wood, but careful in use of iron. Small lock under front wheels, with axle two feet shorter than the hind one. Never painted, and loaded occasionally with six or seven of our tons to three horses abreast. Two tons per horse is considered a fair load; but the horses and roads are both excellent, and the latter without a hill for many miles. In lieu of shafts, this waggon has a pole half the length of a coach-pole, at the end of which the horses are hooked on to whipple-trees—three for two horses, and five for three, as we have at plough in some parts of England. So that no one horse can draw more than the others, the driver walks at their heels with one rein in his left hand, and his right on the pole, as he has to guide it and assist in stopping it; but in passing bridges or other descents he screws up a wooden bar, which catches both hind-wheels. The horses are the most docile I ever saw, and certainly these ungainly waggons follow well. The harness is as simple as our plough-harness. I have endeavoured, but uselessly, to find out the reason for this placing the horses so far from their work. I believe it is that all here are Flemish, staid, sober, money-making people, who are satisfied to do as their forefathers did; and the only other reason is, that, the harness being all alike, they are momentarily detached from one job to another, or an extra horse added over a bad bit of road in their fields. But from this strange combination of horses and waggons two hints may be taken. Decidedly three horses with whippletrees more equally divide their work than with us, and more easily start a dead pull. I have not seen one horse fret, and another hang back, as common at home; and I see no reason why we should not attach them in the same way. Some may think one-horse might pull the other back till his hocks were on the front wheel; but if we had a pole (or two poles for three horses), the pole pieces would prevent this. How admirably these bars are adapted to the three-horse omnibuses of London, as they *must* all draw alike. As regards the men, ours might imitate their sobriety, cleanliness, and kindness to their horses. I have not seen one horse struck; they all (gentlemen's coachmen too) crack their whips backwards and forwards, that is, twice to our once, and are quite proud of the horrid noise. Fancy a nobleman's coachman doing this in Hyde Park! The other hint we may take from their collars: The hames are attached to them, and go all round. They open at bottom, with a hinge at top, so have no occasion to be thrust over the head. They are quickly put over the neck. At the bottom each hame has what I can only describe as half of a door-hinge; these are pressed together, and a pin inserted, and all is done is most quickly. We all know the trouble in England with colts and bad-tempered horses to get the collar over the head. I must think theirs the better way. All collars, whether nags or cart-horses, are the same.

The next attraction is the splendid asses; I did not know there was such a breed out of Spain—the Flemish ass, over twelve hands high, fat, handsome, and good workers. They never are shod, though they work on the roads, and are of the value of £12 to £14. I could not believe it, till all told me the same. The environs of Dunkirque for three or four miles are devoted to market-gardening, and principally managed by women, who come into the town with enormous carts of vegetables drawn by these donkeys. They think nothing of half a ton weight being drawn by one; and I saw a man riding on one with a barrel slung on each side of his saddle. But the most picturesque thing is the sight of acountry-woman riding to market on her donkey. She has a saddle of sheepskin, with the wool on, reaching from the withers to the tail. She sits sideways, and has behind her, as on a pillion, a tub of butter, &c., most beautifully clean; and herself without a bonnet, but instead a large cap as white as snow, completes as rural a subject as artist would wish to sketch. The barges of 200 tons on the canals which traverse Belgium and France I think complete the objects of greatest interest in the town.

I should fancy no foreign agricultural subject can be more interesting to your readers than an account of the *bette-raves*, and the manufacture of them into sugar and alcohol, as sugar and spirits we all consume. The former, it is often said, is unprofitable to produce in our West India colonies, and ought to be supplanted by cotton. To say nothing about much of our imported sugar being the result of slave labour, the spirit is doubly a matter of anxiety now that the vines (though better) are more or less affected by disease. It is a root well adapted to our land; and it does seem extraordinary to me we have nothing of the kind. Whether we are prevented by law I know not; and if some of your correspondents would inform me the reason, I would feel obliged

It is the main paying crop of the farmer here; and a most profitable one too, producing great weight, bearing an unlimited demand (except at this moment), and fetching always a remunerating price. Just now there is a complete panic in the trade, sugars having dropped in price, but more particularly spirits, which have fallen nearly half during the last six months, caused by the great crop of beet, the bad quality of them, and the increased supply of alcohol from the vine districts; consequently the roots, which for the last four years have fetched from 14s. to 18s., and in October 21s. per ton, are now a drug at 2s. 6d., and, after March, will be worth nothing, as every month after Christmas they lose some saccharine. So you may imagine the state of the trade and the feelings of the producers.

But, first, as regards the cultivation. The land here being all a splendid loam, is extremely applicable to the production of these roots; but, like our mangel wurzel, they are suitable to clays. Indeed, French chemists tell us that the most sugary roots are produced on clay with a deep top-soil, and containing flint. I need not say, the land requires to be clean: all here is always so. It is ploughed *very deeply* in autumn, well dunged, and sown from the middle of April to the end of May. The quantity of seed required is about 8lbs. to the acre, as it is either drilled or dibbled, with the thumb, one foot apart. The cost of it is about 5d. per lb. It is not liable to be attacked by the fly; and a plant is nearly certain. When the leaves are as long as the little finger, it is singled out, so that each plant stands exactly one foot apart each way; as if thinner, they grow too large. The smaller ones producing the most sugar, they are refused by the manufacturer if weighing much more than 4lbs. each. During the summer of course it is frequently hoed. The leaves are not taken off for cattle during the progress of its growth, as is sometimes done in England with the wurzel; and in September, when the tops droop and turn brown, it is time to lift them. This is often done by the acre, at 16s. I mention this to show how well the farm-labourers are paid here; but it requires to be most particularly well cleaned, which they do for this money, as also cut off the tops and *crowns* (which contain no sugar), and throw the roots into the waggons (carts are very seldom used here). The crop is about 22 tons per acre; often more. If not sold at once, it is clamped, and well covered with earth. Barns, cellars, and walls have been tried, but none do so well as the clamps, which are left open for some time along the whole ridge, to permit every particle of evaporation to escape. In the neighbourhood of a factory whole fields may be seen covered with clamps, the reserve stock of the manufacturers. There are many sorts of *betteraves*, but the two sorts in general growth are the white Silesian, and a variety of the Silesian with a red skin and white interior. It exhausts the land more than potatoes; but though sold off the farm it has the good quality of returning to it as much manure, perhaps, as if wholly consumed on it (indeed the latter would be impossible, as in its raw state it is a dreadful scourer), as all the refuse after pressing—that is the farinaceous part of the root—is eagerly bought by the farmer at from 8s. 4d. to 13s. per ton for his fattening bullocks, cows, and sheep; to the first named he gives 100 lbs. weight per day. Now, as we know a bullock will eat 4 bushels of swedes in twenty-four hours, we may calculate at all events that it stands as 2 to 5 superior in quality to raw roots. This refuse, which looks like pressed rags, and is in flat pieces about as large as the palm of the hand, has also the peculiar quality of *improving* by keeping in clumps (well trod) for two or three years, enabling the farmer to lay in a store when a drop occurs in price. A great comfort to a stock-keeper to know he has always a reserve of food for all weathers and bad seasons. The crop that follows is wheat; hot summers suit it best.

It was a long time known to be a saccharine root in France, but its usefulness was not developed till 1812, when the Government passed a decree permitting the growth to the extent of 250,000 acres, and exempted it from all duties; in three years it ceased to give this encouragement to the growth, but its prosperity progressed; in 1827 there were 89 factories, producing 8 million pounds of sugar; in 1836 more than 500, making nearly 50 millions; in 1837 they put a duty on it of a half-penny per lb., and added another farthing in 1839. From thence to now it has continually advanced.

I introduced myself, one fine morning, at a factory about a league from Lille, as an English stranger, asking the favour of an inspection of it. The owner most politely acceded to my wish, first making me partake of his *déjeûner*, the usual eleven o'clock breakfast of chops, coffee, and wine. This hospitality I felt the more, as it was only the second time during my three months stay I had the opportunity of enjoying it, as all classes are alike unfortunate in their ignorance of our truly English custom of inviting all who cross our threshold to take something, from a glass of beer to a seat at dinner. He then showed me his sugar and his distilling processes; it took three hours to go over it, and a most interesting mass of machinery it was.

The commencement of the process is as follows: The loaded waggons are weighed, as they enter, on a weigh-bridge, and the empty vehicle deducted; the roots then well-washed by steam-power, and drawn into the macerating machine by an archimedian-screw; after this is very minutely performed, the pulp is pressed in hydraulic presses, and the remains in the press bags are instantly ready for sale to the farmer. 180 pints of juice are extracted from 2 cwt. *betteraves*, which goes into a reservoir tolerably impervious to air (which is detrimental) till wanted. It is then heated in boiling-pans to 60 degrees (I am not sure if this means the same as 60 degrees in England); and a solution of lime is thrown in at the rate of 1 part to 20 parts of juice, and a little sulphuric acid to neutralize any excess of lime. It is then filtered with animal charcoal, which also reduces the colour, and then passes into boiling-pans to evaporate; then a second evaporation and another concentration; and then a third filtration with charcoal; then boiling, and at this stage it passes into coolers and begins to crystallize. The remaining processes it would be tedious to your readers to have described.

	£.	s.	d.
One ton of roots will produce 1¼ cwt. sugar, brown, worth, duty included	3	10	0
And also ¼ cwt. molasses, worth	0	2	0
And 2½ cwt. of refuse for the farmer, worth......	0	1	8
And 17 cwt. of juice.			
	£3	13	8

The duty here is two-pence per lb., and it is usually sold at 6d. (not now), which is considered a profitable price.

We undersell the French in most manufactures; so it is fair to suppose we can in sugar, if we please. We were told we were to have free trade, to be totally unshackled, whether it was sugar or tobacco we wished to grow.

The molasses are distilled, of course, and some potass made from the refuse.

Many distilleries are expressly for extracting spirit from the root itself: a ton is expected to make 10 gallons. The whole of the refuse from this is useless.

Beet-root sugar-refining is also carried on to a great extent; the decrease in weight by the process is one-fifth.

White sugar is retailed by the grocers *now* at 8d. to 9d. per lb. *Remember I always write in English measures and weights.*

It is allowed to be a most lucrative trade in all its branches. It is carried on over the whole of this northern department. Valenciennes is the very heart of it; but much is also done near Paris, Marseilles, and on the frontier near Switzerland.

The alcohol is sold for mixing with the Geneva cognac, and also for making *eau-de-vie*; also for varnish, and many descriptions of manufactures requiring cheap spirit. It has been sometimes exported to England, but is not allowed at this time.

Spirits are sold by all grocers, Geneva and *eau-de-vie* at 6d. to 7d. per pint; the licence for which costs £2 1s. 8d. per annum.

I cannot finish this letter without remarking on the cheapness of spirits here, and the general sobriety, and comparing it with the contrary of both in England. It cannot be that the climate is warmer, for there is no hill between this city and the Polar Seas, and it is indeed cold here. The unrestricted sale here, at all events, does not produce drunkenness.

AN ENGLISH FARMER IN FRANCE.

Lille, March 4th, 1858.

QUICKS (CRATÆGUS OXYCANTHA) Common Hawthorn—for general, or, more particularly, for agricultural purposes, are not to be excelled. Their culture is too well known to require any particular comment, did we not see so often erroneous practices carried out; for instance, the planting upon high banks, which dries them up, and, when crumbled down, leaves them exposed to the inroads of cattle, &c. No better example is taught us than those planted by the sides of railways—the Great Western, for instance. There you see them properly planted, well cleaned, and properly sheared—in fact, hedges worthy our best attention. We have often heard Mr. Sharp complain to the unfortunate nurseryman from whom he purchased his few thousand Quicks, that many of them died, when perhaps, as is very often the case, no care was taken in the first place to give them proper accommodation. First, then, the soil certainly, in every instance, should be trenched; and if manured, the plants will repay it. Always plant, if the nature of the soil will permit, upon the same level as the field, not upon elevated banks. Place a fence—constructed with piles about eight or nine feet apart, with two horizontal rails—for protection. Then select two or three years' transplanted plants; and when the plants are well established, say the second year, cut them down within six or eight inches of the ground. The following year cut them to about two or three feet, according to their strength; then the hedge is made. Establishing a good bushy bottom is the principle to aim at. It is a very bad practice to thrust large bundles of bushes into decayed places or gaps: it makes the place larger. It is far better to select strong transplanted three or four-feet trees to fill up with, and give them temporary protection, and thus make up the slight deficiency. Never allow the hedge to produce timber, as you very often see; for after it is cut down, besides the sacrifice for one or two seasons, the old shoots generally throw up strong luxuriant thorny shoots, and form a bad bottom in return. Should the above fence not be practicable, a low bank might be made, putting in plenty of plants between each layer of turf and soil; this last suggestion does not make so perfect a hedge as the former described plan.

ECONOMY IN BREAD.—No. 5.

MAIZE BREAD.

SIR,—Maize may be considered as nourishing as wheat, but will not rise like wheat into light bread; and maize flour raised with wheat flour is neither so pleasant in texture or flavour as wheat bread alone.

The maize requires first to be boiled to pulp, like rice, and so made up with the wheat flour into dough. The following recipe has been much recommended:—

MAIZE BREAD.

To 1¼ lbs. of maize meal add a gallon of cold water (soft) and stir it up well; let it settle, and skim off the husk which floats on the top. It should then be boiled for three or four hours, if possible by steam, or the pan inserted in another containing water, boiling, which will prevent its burning to the bottom; and covered, to prevent drying away. If the meal be good, it will have absorbed all the water that has not evaporated, and have become a thick porridge; the produce of the Southern states of America will take one-fourth more water than the produce of Europe.

This may be made up into dough with 14 lbs. wheat flour as the rice in our last—yeast and salt added—and divided into loaves as usual.

This has been tried here, but did not please so well as that with Carolina rice. On the other hand, the Americans themselves are very fond of "Mush," a sort of maize porridge, made as follows:—

MUSH, AMERICAN.

"This is made in different ways; but the easiest mode is that which resembles the making of starch or arrow-root. Put five pints of water over the fire, in a pot or skillet; then take one pound of Indian meal, well sifted from the bran, and mix with a little cold water so as to make a thick batter; add salt. As soon as the water boils, add the batter, stir it well, and keep it stirred and boiling for at least twenty minutes.

"It should be about the consistence of hasty pudding, porridge, or stir-about; and may indeed be made in the same way. Take it up, and eat it with milk, butter, sugar, or treacle.

"This is the most manageable and convenient of all the preparations of maize; it is used daily in a large number of American families, and considered a most wholesome diet. What is not used at one meal, is cut into slices and fried or heated upon the gridiron at the next meal, and eaten with butter or treacle."

This worked up into dough with flour would be much like the maize bread given above, requiring, of course, more water to work in the wheat flour. And the proportion of maize may be much increased for those who like it. I have a statement of 38lbs. of bread from 14lbs. of flour with 7lbs. of maize. But for those who object to the maize flavour it is to be corrected with rice.

Maize bread with rice, and the compound of the two with M. Mege Mouries' improvement, to obtain the maximum excellent loaf at the minimum cost, the object of all these letters, are intended to form the subjects of our next.

I. PRIDEAUX.

BUTTER-MAKING IN WINTER.

"Winter butter" has no very enviable reputation anywhere, and compared with that made in June, seems an entirely different article. Of course there are reasons for this—let us enumerate some of them.

1. The character of the food is changed from green and succulent herbage to dry hay, or, more generally, cornstalks and straw. There is really very little butter in the latter.

2. The season is changed from mild and warm to cold, bleak, and uncomfortable. There is a constant demand for fuel to keep up the animal heat; this is partly at the expense of the butter product.

3. The management of the milk becomes difficult. If kept in a cellar, and a little above freezing, the milk becomes bitter before the cream rises; if allowed to freeze, the cream rises at once, but is injured in quality, and will produce very white butter; if kept in the kitchen pantry, when very warm during the day and cold at night, it does not rise well, and is apt to be bitter and acid.

Other reasons might be mentioned, but they will readily suggest themselves to the reader. Let us see what can be proposed to remedy the difficulties.

1. Feed well—not dry food alone—but grain and roots, as a substitute for grass. Carrots, turnips, beets, cabbages, etc., are all useful in keeping up the quality of the milk. Let their fodder be cut, and some nutritious slops be provided, if roots are not to be had; and it is well to cut the fodder in any case.

2. The comfort of cows should be carefully attended to. While they suffer from cold and filth, or foul air, they cannot yield as good milk as when in warm, clean stables, or in well-littered and sheltered yards. Water should also be provided—it is the more needed when dry forage is consumed—and it should be so arranged that every animal could drink at will. A supply of salt is also necessary.

3. It is difficult to get a proper temperature for raising cream perfectly in winter. Some butter-makers scald their milk when first drawn from the cow; others let it stand twelve hours, and then place the pan containing the milk in a larger one filled with boiling water, and allowing it to stand twelve hours longer, find the cream raised perfectly. It is said that more and better butter can be made in this way than in any other.

Churning in winter, as usually managed, is often a serious operation. The cream stands too long generally, becoming very sour and bitter; or, it is too cold and froths up, filling the churn, but producing no butter though churned for hours. Let the cream-pot sit near the fire for a few hours before churning, stirring it occasionally that all may get warm alike, and when it is at a proper temperature, 55°—feeling a little warm to the finger—the churning will be an easy half-hour's job, and the butter as yellow and hard as the season will admit of.

We have found that cows generally gave better milk when fed on well-cured corn-fodder, than on second-rate hay, and with "a mess" of roots, apples, or pumpkins, would yield milk of very fair quality. Attention to securing a supply of proper food for cows, and better care of them, would go far to redeem the name of winter-butter from its present character.

J. H. B.

MANURING ON THE SURFACE.

Surface manuring is no new idea; yet if our memory serves us, the practice is almost universally ignored by agricultural writers of the present day, as a method of manuring. It is acknowledged as a very good thing to preserve favourite plants or newly-set-out trees from the effect of drought; but very little beyond this. "Those who imagine," says the editor of the *Working Farmer*, "they find good results from spreading of manure on the surface, and leaving it for days, weeks, or months before it is ploughed under, mistake the action of the litter or longer portions of the manure as a mulch, for the action of the manure on the soil." We so far differ from this and kindred opinions on the subject, that we think manuring on the surface, for ninety-nine farmers in a hundred, the best general method of application. We except all cases where the drill application of compost is found desirable, and garden and lot culture. Nor do we maintain that there is not a more perfect method of preserving and preparing all the elements of the manure heap, by its careful husbandry under sheds, an occasional treatment with diluted sulphuric acid, or some other "fixer," a cistern to catch the drainings, and a pump to pump them back upon the heap, and patience and perseverance and constant watchfulness. A more perfect method still is that of Mr. Mechi, who applies his manure only in a liquid state, and for this purpose has his farm traversed with iron pipes, to convey the fluid to the different fields. He says it pays in England, and it may be so, though his neighbours doubt it very much. But on a Virginia farm, we think sensible men would account the Sheriff of London stark mad, We maintain that this mode of manuring (viz., on the surface) is in itself so little inferior to the most perfect methods, that taking into consideration the circumstances of our farming popluation, the extent of surface and high price of labour. the attention, and time and management that the mass of farmers can give to this branch of their operations, it is for them the most economical and the best. *It will pay better.*

We ask now the reader's attention to the ammonia theory. That *ammonia* is the element of greatest value in stable manures, we do not question. That it is very volatile, flies off and escapes by exposure to the atmosphere, everybody knows. Upon these principles is based the recommendation to plough under, immediately, manures which yield ammonia, that the earth may absorb and preserve it. Now let it be distinctly borne in mind, that *fresh* manure of any sort does not contain this volatile ammonia, but only *nitrogen*, which is not volatile, out of which the ammonia is formed; and that ammonia is generated only as the nitrogen putrefies in the rotting manures. If the manure accumulates in the stable, the warmth and moisture of the daily additions soon bring on active fermentation, and the pungent ammonia which assails us is the result of the putrefaction thus caused. Until this process of rotting commences, ammonia is not formed, and the manure not liable to waste, and it ceases to be generated when the rotting is checked. Now, when we are ready to remove our manure-heaps in the spring, we find them usually rotting to some extent. Let us follow, and observe the whole process. It is taken up first, forkful by forkful, and pitched into the cart; the ammonia, of course, all the time seeking its freedom; it is hauled, reeking and smoking, a long distance perhaps, to the field; now it is dropped into small heaps, where it remains a week or so, until you are ready to plough the land. If you are ready, or when you are ready, these heaps are carefully spread out on the ground, the more perfectly the better, and then ploughed under—not immediately, even under the most careful management, but as soon as it can be done—with a delay, ordinarily, of an average of some hours. Now, with all this necessary opening and forking, and tossing and spreading, our impression is that the free ammonia is very much like the Frenchman's flea, which when he put his finger upon it wasn't there; the point of time when we are ready to lay hold of it, is just when we may as well save ourselves the trouble: it is not there. But let it be borne in mind that the ammonia we have been dealing with, is that only which was generated in the rotting heap before its removal. When the heap was opened to the air, the process of rotting ceased, and ammonia was no longer formed. Supposing, then, this free ammonia is pretty well gone, at any rate we have the remainder of the manure, with its unchanged nitrogen (not ammonia) to deal with. Plough this under to the depth of eight inches, and for want of the proper temperature to cause its putrefaction, it may remain unchanged and unavailable until another ploughing shall bring it up again to the influence of heat and moisture, which will disengage the ammonia. It is a frequent experience, that we plough under deeply, for a spring crop, fresh stable manure, and receive no benefit from it whatever until it is brought up again to the surface, and the wheat crop following reaps the advantage.

But suppose, instead of making a week or two weeks' heavy labour of hauling out manure in the spring, when the teams are at best not strong, and there is a press of hard work on hand, you get rid of this necessity of hauling cut and ploughing under simultaneously, and hauling at your convenience, you throw the manure upon the surface of the grass field, what is the result? At the worst, as we have shown above, there is equal loss of the *free ammonia* when the manure is ploughed under. In both cases, that is about all gone, before it can be with certainty taken possession of, by any process. The mass remaining on the surface, however, the work of putrefaction, which made the free ammonia, and which was stopped by the opening and exposure of the heaps, is now recommenced and very slowly carried on by the warmth and moisture at the surface. The ammonia thus formed is absorbed by the litter above it, and washed down by every shower into contact, and combines chemically with the humus at the surface, or with the soil itself. But bear in mind, that when these frequent removals are made, we never find the heaps in such a state of putrefaction as when we postpone to some one allotted time, and therefore never have so much free ammonia to deal with. A very large proportion of the manure never begins to rot before it is removed. By this plan, moreover, we take favourable opportunities for hauling, and may carry out much of the manure in damp or moderately rainy weather, when the showers will wash the ready-formed ammonia immediately into the soil.

We have thus undertaken to show that the practice of manuring on the surface is not inconsistent with admitted chemical principles, when properly applied; and we submit the explanation to the judgment of practical men, familiar with the processes of farm management.—American Farmer.

CALENDAR OF AGRICULTURE.

The sowing of all grain crops must now be finished as fast as possible, and also lucerne and flax-seed. Finish the preparation of grass meadow lands; sow vetches and grass seeds on wheat and barley tilths. The surface of wheat lands will be rough and stale; harrow it before sowing the grass seeds, and again after the seeds are sown, and roll with a heavy weight.

Prepare as quickly as possible the green crop lands, and towards the end of the month sow beet-root in drills well dunged, and twenty-eight inches apart; steep the seeds in weak solutions, and dry with quicklime. Plant potatoes in drills thirty inches apart, and well dunged with farm-yard manure in a half-putrescent state; use strong sets of tubers newly cut, very moist manure, and in a large quantity; cover the drills quickly, and roll them down. Before the land is drilled, spread pulverized lime evenly on the surface, in two hundred bushels to an acre, and harrow it immediately, or strew the cinders evenly over the] ground, and the subsequent workings of the land will mix the lime, which will be powdered by the dampness of the soil. This mode requires an earlier application than the old way; but it must be more beneficial by reason of the damp and moist exhalations that will be evolved during the dissolution of the hot cinders of lime.

Early crops will now require both horse and hand-hoeing, as carrots, lucerne, wheat, beans, and peas.

Paring and burning of lands will now proceed vigorously. Burn the turfs moderately in a black scorched mass, as in that state carbonaceous matter most largely abounds. It is the best method yet known for bringing into cultivation all lands that contain much fibrous, inert, and ligneous matters.

Burn, for application by the drop drill, rough, earthy, and vegetable substances, found on road-sides and on ditch banks; also peat, and all combustible matters; the ashes will raise crops of turnips.

Rye, and watered meadows, winter vetches and barley, will now be ready for soiling cattle in the yards, and for being consumed on the ground by ewes and lambs. The food is best used by being cut and placed in racks, which are regularly moved over the ground. Fold the sheep nightly on the cleared space, allowing in the fold two square yards to each animal, and two nights in one place. All bare grounds and inferior grass lands may be much improved by the folding of sheep upon them.

The lambing season will now draw to a close. When beet-root and cabbages fail as food for the ewes, give oats, and bruised oilcake mixed, and with a portion of salt. Remove the strong lambs to the pasture fields.

Attend to the milch cows and to the suckling of calves; give the former an ample allowance of juicy food, natural or prepared; to the latter as much milk as the animals can drink. When begun to be weaned, at the end of sixteen weeks, give them in racks in the calf-pens young vetches, bruised cake, bean and barley meals boiled, and linseed jellies. Place a lump of chalk and rock salt to be licked; the latter substance will quicken the action of the digestive organs, and the former will correct the crude acidities of the stomach.

The last remaining fatting bullocks will be sold during this month; use oil-cake in finishing off the animals: the most backward in condition must go to grass.

The season of curing bacon being over, all pigs on hand must go on for summer stores, and come in for early winter fattening. The earliest fat lambs will now come in for sale.

During wet weather, carry all the dung from the cattle yard to the heaps in the fields, and litter the yards afresh for the summer soiling of cattle and horses.

Prepare by ploughing, harrowing, and rolling, the fallows for green crops, keeping most forward the portion to be sown with Swedish turnips next month. Plough clay lands for wheat fallows, and dung across the winter furrows with narrow slices.

SOAPSUDS.—In days that once were, the soapsuds went to the gutter as regularly as the washing-day was ended; and there are too many who allow the plan to be followed in the present day. All do not yet seem to have learned that a tubfull of strong soapsuds is worth as much, as a fertilizer, as a wheelbarrow of good manure. Now every bucket of soapsuds should be thrown where it will not be lost. The garden is a good and convenient place in which to dispose of it; but the roots of grape-vines, young trees, or anything of the sort, will do as well.

THE AGRICULTURE OF INDIA.

Removing my camp-stool to the opening of my little hill tent, I looked out into the fields, where I saw some men ploughing. For the first time, during my travels, I was struck with the appearance of the instrument which the natives use for tilling the soil; an instrument which, in fact, closely resembles that used by the Romans, according to the directions laid down in the Georgics:

"Curvi formam adcipit ulmus aratri," &c., &c.

—and, at first, I felt some surprise that an implement so apparently ill-fitted for the purpose for which it is designed, should answer all the requirements of the cultivator. The substitution of the English plough for this native hùr, has been several times projected by gentlemen who were zealous in the cause of agriculture, but without any success, or reasonable hope thereof; for when we consider the cheapness, and the great amount of labour always available, the general lightness of the soil, the inaptitude of the natives of India for great or continued physical exertion, the inferiority of the cattle, all of which are the marked characteristics of India, it would not only be undesirable, but impossible to introduce the English plough, generally, as an implement of husbandry — an implement requiring physical strength, manual dexterity, and a superior breed of cattle for draught. Rude and simple as the native hùr is, or as it may seem to the casual observer, cursorily viewing the operation of ploughing, it has still many good qualities which render it peculiarly suited to the genius of the Indian cultivator; and it is not in any immediate endeavour to improve it, or alter it, that any real benefit can be conferred on the cause of Indian agriculture. All the efforts, therefore, that have been made in that direction, have been time and trouble expended to no purpose. It has been said, that all improvement to be real, must be spontaneous, or take rise within itself; and it would seem to be more reasonable to improve such means and appliances as the natives use and understand, without running counter to the ideas, and shocking the prejudices, which they entertain, by endeavouring to compel their adoption of European modes of culture, which, however well suited to the land of their origin, have not the quality most necessary to their practicability, that of being comprehensible to the people of India. The true end of agriculture:

"With artful toil
To meliorate and tame the stubborn soil,
To give dissimilar yet fruitful lands
The grain, or herb, or plant that each demands,"

is best to be attained by aiding and assisting the development of those resources of the soil, which have already been made visible by the people themselves.

Here it is that the duty of the Government begins. The precariousness of the land tenure is one of the greatest impediments to the outlay of capital by the tenant in the improvement of the land; and as there is but little prospect of the removal of this objection, the Government should fulfil what would, were the case different, be the obvious plans of the landholder, in developing the resources of the soil. Irrigation and manure are the two great points most deserving of attention. On both points the resources of the country are incalculable; the advantages evident and immediate; both require system and an outlay of capital, which the zemindar (native landholder) is often unable, and oftener unwilling to adopt and incur—from want of confidence in the administration of the law, and the law itself. With the ryot, or cultivator, the case is very different. The law, or the administration thereof, affects him in a very slight degree, compared with the zemindar. The land tenure matters very little to him; his rights have been secured; he profits by the outlay of capital on the land. Risk, he has none. His advantage is immediate. But he does not possess the means of improvement in any way. He may build a well, dig a tank, or plant a grove to the memory of a departed ancestor, and, by so doing, enhance the value of the land to the zemindar; but he almost always ruins himself by the act, leaving his debts to be paid by his descendants, and the well, tank, or grove mortgaged to the banker, for the extra expenses incurred in its establishment! It behoves an enlightened government to do for the people and the country, what they are unable to do for themselves. An inquiry, properly set on foot, and undertaken by competent persons on the part of the Government, to investigate all particulars regarding the state of agriculture, would bring to light many facts, which, if made fitting use of, would not only greatly redound to the honour, but adduce greatly to the advantage and profit of the state. The information thus acquired, and not founded on the reports of native (government) collectors, police-officers, and peons (messengers), but ascertained by the personal inspection of European officials, and from the opinions of the zemindars and cultivators themselves, would enable the Government to know and devise remedies to obviate the evils arising out of the gradual decline of the agricultural classes in our earliest occupied territories. It would show the Government many places where the expenditure of four or five thousand rupees (four or five hundred pounds) in the repairs or erection of a dam, for the obstruction of some rain-filled nullah (a wide and deep ditch), would yield a return nearly of equal amount, besides affording employment, and the means of livelihood to hundreds of persons. It would show where the opening of a road, or the building of a bridge, involving but a small expenditure, would give a new life to a part of the country hitherto forgotten, and render the inhabitants flourishing and happy, by throwing open to them a market for their produce—a market at present out of their reach. It would prove incontestably that the means of irrigation—the true water-power of India—has been even more neglected than the water-power of that (in comparison with the United States) sluggish colony, Canada. The initial step once taken—the march of improvement once fairly set on foot—private enterprise, duly encouraged, will follow in the wake of the Government; and capital once invested, land in India will become intrinsically valuable, and thus obtain the attention it merits. Agricultural improvement would induce lasting and increasing prosperity of the cultivating classes (the bulk of the population) and of the country itself.—*Household Words.*

AN AGRICULTURAL ODE.

BY WM. C. BRYANT.

Far back in ages
The plough with wreathes was crowned,
The hands of kings and sages
Entwined the chaplets round,
Till men of spoil
Disdained the toil
By which the world was nourished,
And blood and pillage were the soil
In which their laurels flourished.
Now the world her fault despairs—
The guilt that stains her story,
And weeps her crimes amid the cares
That form her earliest glory.

The throne shall crumble,
The diadem shall wane,
The tribes of earth shall humble
The pride of those who reign;
And war shall lay
His pomp away;
The fame that heroes cherish,
The glory earned in deadly fray
Shall fade, decay and perish.
Honour waits o'er all the earth,
Through endless generations,
The art that calls the harvest forth,
And feeds the expectant nations.

NORTON FARMERS' CLUB.

Report of the Judges (Mr. L. Furniss and Mr. J. J. Rowley) on the farms which competed for premiums in October last:—

"In examining the farms contesting for the premiums given by Messrs. Henry Rangeley, J. Dodson, and Wm. Staniforth, the judges had an agreeable and pleasing, yet difficult duty to perform. They had pleasure in witnessing the industrial efforts to cultivate and improve the soil of a district generally tenacious and frequently hilly; and in a sharp contest, they felt a difficulty in adjudicating according to the exact terms of the premiums offered. Having this difficulty before them—where the merits of each are so nearly balanced—it seems only reasonable and fair that the several competitors should have some mark of distinction to show a degree of merit, so that, if one competitor should win (to use a sporting phrase) by half a neck, the judges might have the privilege of placing the second and third in the race. For the reasons above stated, we recommended this arrangement to Mr. Rangeley, who generously consented to give us a discretionary power in awarding his premium of £5 to be equally divided between the several competitors—Mr. John Plant, of Birley; Mr. William West, of Windy House; and Mr. Thomas Parker, of Bowshow.

"We commenced the inspection of these farms on Tuesday, the 13th day of October, 1857. There had been a similar inspection in the previous year, and the system of cropping and general husbandry on these farms having been already described and published, it does not appear necessary on the present occasion again to notice it. But we have much pleasure in recording our entire satisfaction in the cultivation of these farms, as adapted to a *locale* immediately surrounding Sheffield, and not having any analogy to the cultivation of farms situate in a district strictly rural. Hence the difficulty of prescribed rules of husbandry and the laying down of a code and system of cropping, which ought to vary and will vary according to circumstances and situations. Climate and soils will have their effect; the quantity of rain falling, the proximity to mountains and towns, all exert an influence on cultivation, and give a wide scope for judgment in determining the course of husbandry to be followed. We are witnesses to these important elements in the cultivation of land, and hope we may say without vanity that, having had some experience in these matters, we are privileged to make any remark of praise or censure. Indeed, it may be expected that we should, in our perigrinations through the district, cast a farmer's eye, with furtive glance, over hedges and across the stubbles, where grow the stately thistle, the hardy couch grass, and the umbrageous dock—giving unmistakable evidence that in the 19th century these upas trees are cultivated in the parish of Norton, and at an easy distance from the metropolis of Hallamshire. But the cultivation of these plants is not the rule, it is the exception; and if there be much to condemn, there is more to commend and applaud. Still they are cultivated; their seeds are sown by inattention and neglect, and by the ignorance of natural laws bearing on good husbandry. In truth, the growth of these plants on the farm may be aptly stated as a disease of the skin, which, as in men and animals, affects the whole body corporate; the best remedy for which is cleanliness, and the application of purgatives, as administered by Dr. Bentall and others celebrated at the present day for the cure and eradication of cutaneous poison plants. It is not, however, the plants which are grown, to which we desire to call attention; it is the plants which are not grown, but which ought to be grown. There is a similarity in leafy appearance between the dock and the mangold. In the language of the ancient writer, we 'cleave to one, and despise the other.' The couch grasses and Italian grasses are similar in genera, but their effects are dissimilar and wide as the poles asunder. Like homœopathic treatment, as propounded by Dr. Hahnemann, a very small dose of couch grass will drive out Italian grass, and establish a cutaneous disease, that we imagine will run speedily over a hedge, across a turnpike road, or even a canal; such are its powers of contagion, or infection, or both. The thistles may be a stately plant—it is a Scottish emblem—but to our notion, we say, as appointed judges, it is the monkshood of Norton husbandry. And we do most earnestly recommend the club to abandon the growth of these exhausting plants, and substitute instead some of the genus colewort, such as the branching rape, the Scotch kale, and last but not least, the cow cabbage. We admire the plants we have mentioned, but we saw few or none. Some attempts to grow them were visible, but like 'angels' visits,' they were 'few and far between.' From Windy House to the Lees, from Birley to Bowshaw, these useful esculents were rare, and might really be looked on as exotics, and supposed to require a glass-house to grow them. No such thing; we tell you that, like the daisy, they blossom anywhere and everywhere. We tell you, wherever the dock will grow, so will the mangold; and it is a great fact that the rape and the thistle will grow on the same soil, but not at the same time and place. If farmers wish to grow thistles, they ought to be in rotation; and part of the course of husbandry pursued on the farm, and not at the same time and place as other root crops or legumes. Thistles and docks might be grown in alternate rows with mangolds or colewort; but we do not recommend it; and unless it could be proved that this course would suit the balance sheet when stock is taken, we advise the club not to patronise or follow it. Still, it is followed; and it may be gathered from these remarks, that in the inspection of the farms contesting for the prizes offered by the Norton Club and its members, we complain that these beef and mutton producing plants receive but little or no attention in the district. They are to the farmer 'the Hebrew, Greek, and Latin of the school-boy.' But when understood and cultivated, they are the classical as well as the practical and useful in husbandry. We have digressed, and must now leave the grumbling, to notice other things more agreeable in our report.

"In class 36, where the premiums are given by Messrs. Dodson and Staniforth, for the best cultivated farms under 50 acres, we found three competitors—Mr. Hutton, of Ridgeway; Mr. Joseph Wragg, of Norton Lees; and Mr. George Rogers, of Lightwood. These farms, considering the limited time we had at our disposal, were carefully inspected, with a view to do justice to the gentlemen who had generously offered the premiums.

"On inspection of Mr. Hutton's farm of 28 acres, we found the land in a good state of cultivation; the farmery well arranged and in good order; the whole of a character creditable to the occupier.

"Next in succession in this class of farms we visited Mr. J. Wragg's farm, of Norton Lees, consisting of 32½ acres. Judging from the produce of this farm, the crops must have been very good; the root crops exceedingly clean and well arranged, having been highly manured, as evidenced by the weight of the crops. The whole of the land on this farm is in a high state of cultivation, the fences in a very creditable condition, and present a neat appearance; stock numerous and good; farming premises very orderly, and every department of the farm showing evident signs of preserving industry.

"Mr. George Rogers' farm, at Lightwood, consisting of 30 acres (20 occupied since March, 1856). On inspection of this farm we were very much pleased with the substantial character of the improvements effected by the occupier in so short a time. A considerable sum must have been expended. 15 acres effectually drained with pipe, tile, and stone. Depth of drain, 30 to 33 inches, five yards apart. A considerable length of old, neglected hedges plashed, the sides grubbed close up to the fence. The root crops highly creditable, being very good and well arranged; additional buildings put up at the farmery; the house renovated and much improved; new gates introduced. The whole of the operations carried out in a most determined and skilful manner. Having seen this farm when first entered on by its present occupant, it being then in a most dilapidated condition, great praise is due to Mr. Rogers for the many and great improvements made in so short a time.

"To conclude, we can only add one remark, and that will apply to all the farms in this class. We saw proofs of good husbandry, neatness, and cleanliness throughout. Capital and labour had been judiciously expended; and when the contest was sharp, and on nearly equal terms, we did not quite agree in our views and opinions. The matter in dispute was left to the arbitration of one of the competitors, who generously decided against himself, that Mr. Wragg should be No. 1, and Mr. Rogers No. 2.

"In offering the above report and animadversions on what we saw and examined, we trust that they will be received in the same spirit in which the men of the Norton Club always receive good intentions."

SUFFOLK LENT ASSIZES.

BREACH OF CONTRACT.

GARRETT *v.* WOOLNOUGH.

This was a Special Jury case.

Serjeant Wells and Mr. O'Malley for the plaintiff, and Mr. Couch for the defendant.

The action was brought for breach of contract.

Mr. O'Malley having opened the case,

Mr. Garrett deposed: I am the senior partner of the firm of Garrett and Sons, Leiston Works. At first I carried it on myself, and then took my sons in. The defendant was formerly in my father's service, and continued with me down to 1855. He occupied the post of foreman over a small portion of the manufactory and salesman up to April, 1854. He had a salary of £150 per year and a house. In November or December, 1853, the defendant reminded me that the agreement terminated, and that he wanted an advance of salary. I agreed to advance him £50 per year. He afterwards wished that the £50 should be paid for five years in advance, to which I agreed, and an agreement was drawn up. He suggested that it should be binding for ten years, so that at the end of five years I should pay him another £250. The £250 was paid on the 6th of April. On the 31st of July, 1855, the smith's foreman showed me some ironwork which Woolnough had sent back, and on the 1st of August, as I was standing at the counting-room door, the defendant came up to me, and in abusive language said he would not be humbugged any longer; he was going away. I turned round and said, "What's the matter?" He was in a passion, and I told him to go home and consider the matter. I said, "There is an agreement between us, you had better look to that." On the following day I sent for defendant, and he came to my counting-house, and I asked him if he had considered what he said the day before, and he said "Yes, he was going." The 31st of July was a critical period, being after the Royal Agricultural Society's Show, and we had many orders, particularly in defendant's department. After some conversation, I told him he must pay me back the proportion of the bonus; but he laughed, and patted his hand on his pocket, and said he should keep it. I suggested he should go and ask advice as to that of some man of business. The day after he came again, and said he had been for advice and found he must return the money; and he would pay it me if I would give a receipt in full of all demands and cancel the agreement. I refused to take the money on these terms. (The receipt which Mr. Garrett proposed reserved to himself any rights he might derive under the agreement.) He would not pay the money on this receipt, and went away. The defendant had a son-in-law named Sudbrook in the smiths' department. The defendant had been of great use to me in the sale department, and after he left me my sons were obliged to attend to the getting proper foremen into Woolnough's department instead of the general supervision. We tried to get persons to suit us as salesmen, but could not, and we lost very much commercially. I employ 600 or 700 hands, 60 or 70 of whom were under the defendant's supervision. I would rather not state the loss, but I would have gladly given another man a larger salary as a user and seller of implements.

Cross-examined.—I don't think we received any damage from his leaving us as foremen. We made better implements without him than we ever could have done with him, but we had to neglect the selling department, and lost more by that. It is very difficult to replace a foreman to sell implements and show them to the best advantage. He had been with me many years as my assistant, but when my health failed I sent him. Other men used to go with me to show particular implements. On the 2nd of August he did not ask me to allow him to remain. I did not say that when he left the room he would no longer be my servant. After we had made our arrangements I understood from my son that he was desirous of remaining. On the 4th of August I wrote a letter, in consequence of an application from him, stating that "W. Woolnough knew R. Garrett's views, and when he was prepered to fall in with their views R. G. would see him." Had not made any arrangements for substituting him as a seller of implements, but as a foreman. On the 4th of August he wished to leave, but in consequence of his behaviour I could not allow it. I did try to make an arrangement to keep him as salesman, but failed. On the 10th of August defendant received a letter from my son. (The letter stated he could only be received back on R. Garrett's terms.) The terms were that he should show the implements and buy timber, and should have £50 a year for buying timber and 10s. a day when he attended market. I thought I should make his income as much as formerly. Mr. Neeve came to me and asked me to take him back under the old contract. We appointed three men the same day to take Woolnough's place as foreman. They were paid as common workmen before, but their wages were advanced £1 and 10s. a week.

Re-examined: I received his letter on the 31st of July, but did not proceed to make arrangements to fill his place until the next day. I could not put the defendant as foreman over a number of men after he had abused me before the men without any cause whatever.

Mr. E. Cottingham, brother-in-law of the plaintiff, corroborated the previous witness as to the conversations which took place between him and defendant on the 1st and 2nd of August.

Cross-examined: Mr. Garrett never said, "When you leave this room you are my servant no longer." I advised Mr. Garrett to give defendant the agreement and settle, but he would not. I also advised the defendant to settle it.

James Kirrage deposed: I was in plaintiff's service in July, and Woolnough said to me Ludbrook was the man to be put foreman over the smiths' department. On the evening of the 2nd of August the defendant came to my house and said, "I have left Mr. Garrett's service, that's certain, and will stand no more of their humbug." I asked him not to be too fast.

Mr. Taylor deposed: I have been with Mr. Garrett thirty years. On the 31st of July Woolnough came to me to settle with him for his expenses to Carlisle. I refused; and he said he was off, he would have no more of it.

Cross-examined: I refused to settle the expenses, as I heard there had been some unpleasantness between him and Mr. Garrett. As the firm had advanced money to him I did not know whether he had money to pay or receive.

This being the plaintiff's case,

Mr. Couch contended that no breach of covenant had been proved.

His Lordship held that the defendant had not left the plaintiff's service; but was ready to perform the agreement, only he would not let him.

Mr. O'Malley objected and his Lordship reserved the point.

Mr. Couch was addressing the jury, when his Lordship suggested that a juror should be withdrawn on the defendant paying the proportion of the bonus £184, Mr. Garrett promising if any balance was due to the defendant it should be deducted from £184.

Mr. Couch applied for time for payment; but on Mr. O'Malley objecting, it was agreed that the money should be paid under a rule of court in a month.

Mr. O'Malley stated that there were three other actions pending for infringement of patent, and his client was willing to refer the cases to any three respectable men.

Mr. Couch declined to do so.

SIMPLE TEST FOR GUANO.—A bushel of guano, if pure, weighs almost exactly 70 lbs.; if adulterated with light substances (which is rarely the case), it will, of course, weigh less. If clay, marl, sand, &c., have been used, the weight will be materially increased, and, so far as this test applies, gross adulterations will be easily detected.—*Cameron's Chemistry of Agriculture.*

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MARCH.

Since we last wrote, the weather in nearly all parts of the United Kingdom has been very favourable for out-door farm labour, in which, consequently, great progress has been made. Much of the light wheats, and most of the spring corn, have now been sown even in our backward counties, and the land has been everywhere in fine condition for the reception of the seed furrow. So far, therefore, everything is in a satisfactory state; but when we consider the wheat trade, the continuous decline in prices, and the future prospects of the growers, there is reason to anticipate a state of things—as respects wheat in particular—almost without a parallel. The effects of the late severe panic in the commercial world—a panic that has led to a decrease in our aggregate shipments during the first two months of the present year, compared with last season, of nearly *four millions* sterling—have, to some extent, produced a decline in the consumption; there is literally no speculation going on, either in home or foreign produce, notwithstanding that money is unusually abundant and cheap; and great anxiety continues to be shown by the holders of foreign grain to sell at almost any price. The result of the last year's wheat harvest in this country shows an enormous yield, and an unusually large quantity on hand, both in barn and stack. Throughout France the produce seems to be equally large; and the same state of things prevails in the United States. The consequence is that we have hed all sellers and very few buyers, except for immediate consumption, and forced sales of grain have continued, to the prejudice of the value of home-grown qualities. Again, in order to compete with French flour—which may be had as low as 34s. per 280 lbs., free on board, at Nantes—the town millers have reduced their top price to 40s, and country marks have fallen in an equal proportion. The value of wheat has, too, declined fully 4s. per quarter, and the question generally asked is—When will the downward movement cease? We can scarcely assume that wheat can be much lower than it now is, because it would be better for the wealthy growers to withhold supplies altogether, and take the chance of future markets, than sell at present quotations; but, at the same time, it is very evident that any advance cannot be anticipated at present. The last official averages show a fall in the quotations, compared with the same time last year, of about 12s. per quarter, and, in the present tone of the trade, that difference seems likely to increase than diminish. From France, the north of Europe, and from the United States, we are threatened with heavy importations in the face of great abundance at home, and there is not the slightest appearance of speculative investments.

The want of speculation has compelled the foreign houses to sell on their own account; consequently there has been no accumulation of supply in warehouse. However, there is no question but that the downward movement must have a limit, and that ordinary prudence on the part of our farmers, and of shippers generally, will have its accustomed influence upon the demand.

The barley trade has continued healthy, and prices have ruled steady. Oats, beans, and peas have likewise commanded extreme, to rather advanced, rates; and these articles are likely to sell well, and at full quotations, during the remainder of the season.

A further advance, owing to their scarcity, has taken place in the value of the best potatoes. We, however, continue to receive large supplies from the Continent, in fair condition, and which have changed hands at from 80s. to 105s. per ton. Evidently, the extent of our growth last year—though we admit that a large portion of it has turned out unfit for human consumption—has been much under-rated, as, even now, the supplies on hand are extensive.

The result of the last Colonial sales is quite as satisfactory as could have been anticipated, considering the dulness of trade in our manufacturing districts. Fine wools sold at 1d. to 1½d. per pound more money; but inferior qualities went lower. The English wool trade has been in a state of great depression, and the fall in prices during the last six months has been fully forty per cent. This decline arises, in some measure, from the almost total absence of the usual Continental orders. This year's clip is turning out unusually large, even in districts not generally considered "crack" ones. Advices from Australia bring great heaviness in the wool trade, and a fall of from 1d. to 1½d. per pound in the quotations.

In the value of hay and straw very few changes have taken place. Meadow hay has realised £2 10s. to £4 4s.; clover do., £3 10s. to £5; and straw, £1 5s. to £1 10s. per load.

Throughout Scotland farming operations have progressed steadily, and the wheat trade has ruled heavy, at drooping currencies. Fat stock has likewise fallen in value.

In Ireland, the transactions in all kinds of produce have fallen off, and prices have ruled in favour of buyers. The shipments of grain to England have been very small for the time of year.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that only moderate supplies of fat stock have been on offer in the Metropolitan Market, the greatest heaviness has prevailed in the trade generally, and a serious decline has taken place in the quotations. The continuous fall in prices has led to the opinion in various quarters that the consumption of food *in London* is rapidly falling off. Such, however, is not the fact, and the cause of depression in the currencies may be easily traced. That an unusually small amount of butchers' meat is now being consumed in the manufacturing districts, is obvious from the enormous supplies which have reached London by railway, and which, in a general way, would have been sent to Manchester, Birmingham, &c. These supplies—which, in some weeks, have amounted to *twenty thousand* carcasses—have been overwhelming; so large, indeed, have they proved, that the greatest difficulty has been experienced in effecting sales on any terms. Had they been only moderately extensive, seeing that the consumption of meat in London is still large, prices would not have run down to their present low point, and great losses, on the part of those who bought store stock at high values, would have been prevented. On the part of the foreigner there has been very little competition, as the surplus produce of both Holland and Germany is still directed to France. In February there were imported into that country 19,119 oxen and sheep, against 23,513 in the corresponding month in 1857, and 23,050 in 1856. It is true that these figures show a slight falling-off when compared with the two previous years; yet they prove that the production of live stock in France is considerably less than the consumption. Our dependence upon the foreigner, as will be seen by our statistical details, is now reduced to a nominal amount, and the reduction in our importations shows a steady onward progress in our production, both as regards number, weight, and condition. The high prices prevailing in this country up to a recent period have, no doubt, operated as a stimulus to production; and our impression is that there is now more stock, both in England and Scotland, than has been known for many years past. Perhaps, however, our remarks may be more strictly applied to beasts, the breeds of which are now undergoing changes of great importance. In Norfolk the shorthorns have been more generally introduced, not only as a separate breed, but they have been mixed with Scots, until the pure breeds of the latter have become much less numerous than formerly; in point of fact, the Scots in Norfolk are not now kept up, as formerly, by direct arrivals from Scotland, owing to the Scotch breeders keeping their store animals at home, and the shorthorns have been more generally introduced into that and the adjoining counties as fresh blood; hence, of late years, noble-looking and heavy Scots, to all appearance, have arrived from Norfolk; whereas it has been recently discovered that they are crosses with the shorthorns. The supplies of really *pure* Scots now derived from Scotland for the Metropolitan Market are gradually falling off: the size of the stock is increasing, and yet no fault can be found with the quality of the meat. Scotland, therefore, arising from the steady increase in the growth of the root crops, is now furnishing more meat than at any given period during the present century. To some extent, these remarks may be applied to Ireland. The old Irish breed, generally a slow feeder and a large consumer, is making way for English blood. Crosses are now the general fashion, and we are, consequently, enabled to draw stock from most of the Irish ports during each month of the year. We will not now stop to argue the question whether this comparative neglect of pure blood will eventually reduce our supplies of food; but, to all appearances, the system up to this point has worked well, and greatly increased the amount of consumable food.

Compared with the corresponding period last year, prices, almost generally, show a fall of nearly 1s. per 8 lbs., but we see no reason to apprehend any further important decline. True, we have bread at very low figure—viz., from 4½d. to 7½d. per 4 lbs. loaf; but, on the other hand, potatoes of good and sound quality are very scarce and dear. It frequently happens, however, that whilst the commerce of the country is in an active state, and whilst the price of wheat is low and drooping—such being the case at this moment—the effect upon the value of other kinds of food is important; and it is just possible, even though the trade of the country may revive, that both beasts and sheep will be selling at rather low quotations during the next two or three months, unless there is a considerable falling off in the arrivals of dead meat per railway.

In nearly the whole of our grazing districts the health of the stock has continued good, and very few losses have been sustained by disease. The lambing season has passed off remarkably well, the weather having been highly favourable for it, and the fall has been larger and stronger than for many years past.

The following return shows the importations of live stock into the United Kingdom during the past month:—

Beasts	666	head.
Sheep	318	„
Calves	527	„
Total	1,511	„
Same time in 1857	5,419	„
„ 1856	1,842	„
„ 1855	2,103	„
„ 1854	8,409	„
„ 1853	10,884	„
„ 1852	6,747	„
„ 1851	8,381	„
„ 1850	6,004	„

The above comparison shows that last month we imported a smaller amount of supply than during the last eight years; but this falling-off has been *more* than made good by increased production at home—a fact which appears to be worthy of special remark.

The total supplies of stock shown in the London market, derived from all sources, have been as under:—

Beasts	17,821	head.
Cows	476	„
Sheep and lambs	74,410	„
Calves	704	„
Pigs	1,915	„

COMPARISON OF SUPPLIES.

March.	Beasts.	Cows.	Sheep.	Calves.	Pigs.
1857....	17,345	490	74,880	1,118	2,230
1856....	22,623	470	100,700	797	2,140
1855....	18,644	380	88,790	835	2,765
1854....	20,588	532	98,060	1,091	2,780
1853....	19,228	360	85,680	1,614	2,780

The few lambs on offer have sold slowly, at from 6s. to, in some instances, 7s. per 8 lbs.; and the supplies of sheep out of the wool, have rapidly increased. The general quotations have ruled thus:—

		s.	d.		s.	d.
Beef,	from	2	10	to	4	6
Mutton		3	0	—	5	2
Lamb		6	0	—	7	0
Veal		4	0	—	5	2
Pork		3	0	—	4	4

COMPARISON OF PRICES.

	March, 1855.					March, 1856.					March, 1857.				
	s.	d.		s.	d.	s.	d.		s.	d.	s.	d.		s.	d.
Beef, from	3	4	to	5	0 ..	2	10	to	4	10 ..	3	4	to	5	0
Mutton..	3	4	—	5	2 ..	3	2	—	5	2 ..	4	2	—	6	0
Veal	3	10	—	5	4 ..	4	10	—	6	0 ..	4	4	—	5	8
Pork	3	2	—	5	4 ..	3	4	—	4	8 ..	3	6	—	5	2

The month's arrivals of beasts from Norfolk, Suffolk, Essex, and Cambridgeshire have amounted to about 10,610 Scots and shorthorns; from other parts of England, 2,600 of various breeds; from Scotland, 1,720 Scots and crosses; and from Ireland, 1,350 oxen and heifers.

Immense supplies of each kind of meat have been on offer in Newgate and Leadenhall. The trade generally has ruled heavy in the extreme, and a considerable fall has taken place in the quotations. Beef has sold at from 2s. 10d. to 4s.; mutton, 3s. 10d. to 4s. 4d.; lamb, 4s. 8d. to 6s.; veal, 3s. 8d. to 4s. 8d.; and pork, 3s. to 4s. 4d. per 8 lbs. by the carcase.

The City authorities—under, we presume, the impression that a change of day will improve the trade of the Metropolitan Market towards the close of the week—have determined to change the day of holding the market from Fridays to Thursdays. The continued falling-off in the supplies of stock, when compared with Smithfield, and the enormous sums lavished upon the new market, have rendered it necessary to double the tolls; and now, in order to attract additional supplies and more buyers, a change in the day is considered necessary. The authorities should bear in mind that double tolls will have the effect of reducing the supplies shown—that ever since the market has been removed a smaller number of stock, taken in the aggregate, has been brought forward—and that any change in the day ought to be taken into consideration by purely practical men. We are told that the butchers require more time to get their stock home and slaughter it for Saturday's business; but surely every man at all acquainted with the trade must be aware that the butcher—more especially as he has now to travel several miles of additional ground—finds it necessary to visit, *in one day*, not only the Metropolitan (or live) market, but also Newgate and Leadenhall. Now, in hot weather, this would be impossible; and it is quite clear to us that the change—as was the case many years since—will prove a complete failure, and that eventually only one market day will be held in each week, because unquestionably the butcher's interest must be consulted, or he will turn his attention to local markets, which are now rapidly increasing in importance.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

CARMARTHENSHIRE FAIRS.—Cattle fairs have been held at Haverfordwest on the 20th, at Narbeth on the 22nd, and at Newcastle Emlyn and Cross Inn on the 23rd of this month. The show of store beasts was considerably under the average of former years, and the dealers purchased very sparingly at from 12 to 15 per cent. lower than last year's prices. Fat cows sold readily at from 5d. to 6½d. per lb., according to quality, sinking the offal. The few cows with calves shown, sold at highly remunerating prices. Horses and colts were scarce, and sold at very high rates. The small number of bacon pigs and porkers sold at from 5½d. to 6d. per lb. dead weight. A fair number of store pigs were on offer; these sold rather sluggishly at lower prices.

DERBY FAIR.—The horse fair was very small, and with few exceptions the animals exhibited were of a middling character. In horned cattle and sheep very little business was done. The attendance was unusually scanty, and the fair is described as being upon the whole "very poor."

DURHAM FAIR. — Buyers were numerous. Colonel Teasdale attended as a purchaser on behalf of the Government. Superior horses sold at about 100 guineas; army horses, £25 to £30, and in some few instances, £35; best cart horses, £30 to £35 per head; commoner animals were a drug. Prices are 10 to 15 per cent. lower than last year. Dealers and farmers state that prices are yet likely to fall considerably.

EAST RETFORD FAIR.—There was a good attendance of buyers and sellers. There was a very large show of agricultural and draught horses of a superior description. There were but few hacks shown, and but little business done in either description of these animals. Prices ruled, for really useful sorts of draughts, from £33 to £40; hacks, £20 to £30. As usual there were plenty of "offal" horses on sale. There was a large supply of cattle, but very little fat stock on sale. Drapes and steers readily sold from £9 to £14, according to size and quality. Milkers and store beasts went off sluggish. There were but few calves. Beef sold at 8s. per stone, and mutton at 6½d. per lb. Hogs realised 37s. fully. Few sheep were penned.

HELSTON FAIR.—Purchasers were not willing to give so high prices as ruled for some time past. Towards the close of the fair, however, a good amount of business was done. A fine lot of bullocks, five in number, reared by Mr. John Tyacke, of Merther, was sold by auction, and realised good prices.

HEXHAM FAIR.—A moderately light show of cattle, which met a brisk demand at good prices, excepting milk cows, which sold slowly at drooping prices. Horses a very good show; demand slack, prices lower, and many left unsold. Pigs a numerous show, at lower rates, and part left unsold.

HORNCASTLE HOG SHOW AND FAIR—Was the largest that has ever been known, the recent favourable alteration in the weather having brought sellers of stock into the market in large numbers, in expectation of a rise in prices. Both beasts and sheep partook of the upward tendency, and although the market was rather lower than was anticipated, the stock exhibited was gradually disposed of. There was a strong interest excited in the competition for the silver cup, given by Mr. Stanhope to the exhibitor of the best pen of hehogs; the competitors being Mr. Parker, of Walmsgate, Mr. Jos. Walter, of Edlington, and Mr. Jos. Davey, of Fulletby. Mr. Parker was again fortunate enough to bear off the prize, and obtain a companion to the cup he won last year. The judges were Jos. R. Kirkham, Esq., Andleby, Mr. Harwood Mackinder, Langton, and Mr. Mayfield, Dogdyke.

ILSLEY FORTNIGHTLY MARKET.—There was about an average supply, and a fair attendance of dealers. The sheep this season are in good condition, and handled remarkably well. The trade was dull, but eventually nearly the whole was disposed of at about 1s. to 2s. per head reduction from that day fortnight.

LEOMINSTER FAIR was well supplied with most descriptions of stock, but the trade ruled dull except for steers and good barren cows, and these were in demand at high rates. Cows and calves met with customers and remunerative prices. Beef averaged 6½d.; and wether mutton, in the wool, 7½d. per lb. Pigs were low. Really good horses in demand at high rates; inferior animals lower.

MUIR OF ORD FAIR.—3,689 sheep, chiefly Cheviot hoggs, were for sale. Last year the number on the same day was 3,690. On this occasion the sheep were in fair condition, but not equal to last year; and in estimating the fall of prices, some allowance must be made for this fact. The want of keep throughout the country, and the depreciation in prices, told heavily on the market. Until about three o'clock only two transactions were reported; these were two lots, each of from 300 to 400 Cheviot wether hoggs, in good condition and well-bred, which were sold at a guinea a-head—Mr. Scobie, Lochinver, and Mr. Clarke, Eribole, being the purchasers. They were reported to be the best lots on the ground. After three o'clock Mr. Scobie gave the market a little activity by purchasing several lots of hoggs, at from 18s. to 20s., which were counted cheap at the money, and sold from want of keep at home. Mr. Fraser, Mauld, bought a lot of Cheviot hoggs from Mr. Ross, Fairburn, at 14s.; and another lot at the same figure. Mr. Sim, Scotsburn, sold a lot of black-faced hoggs at 13s. A fine lot of half-bred wethers, belonging to Mr. Maclennan, Tomich, were intercepted on their way to the Inverness steamer, by which they were to be sent to Edinburgh, and were bought by Mr. Jackson at 35s. a-head. Mr. Mackay, Cape Wrath, bought Cheviot wether hoggs at 19s.; Mr. Mackenzie, Balnabeen, sold the Mulcbaich shot Cheviot wether hoggs at £16 per clad score. The market on Thursday was duller than on Wednesday, and at a late hour little or nothing had been done. Forty cattle were on the ground, fifty horses, and seventy-six pigs, besides a large portion of the sheep exposed on the previous day. A good many horses changed hands, and most of the pigs; but, so far as we could learn, there was not an offer made for any of the lots of cattle, and nothing further was done in sheep. Horses were greatly down from last year, and pigs were selling at something like 20 per cent. less than at the corresponding market of 1857.

NEWARK FAIR.—There was a moderate supply of store beasts, which sold as well as was expected, at prices considerably below those realized this time last year. There was a good supply also of milking cows, but prices were not so high as at previous markets. We had a good show of sheep, which sold off much lower than last year; hogs fetched about £2 each. Not many lambs were shown at the stock market on Tuesday; the show of sheep was good. Prices were 6d. per lb. out of wool, and 7d. in wool. Beef realized 7s. to 7s. 6d. per stone.

ROSS FAIR was not so well attended as it generally has been. Beef fetched 7d. per lb., mutton 6½d. There were very few horses offered, and the sales were generally dull.

UPTON FAIR.—The supply of stock was larger than usual. Useful cows and calves sold at from £13 to £14 apiece; barrens about £11 or £12 each; wether sheep averaged from 30s. to 40s. a-head. Store pigs were numerous, and were disposed of at a considerable reduction in price from last year's value.

WREXHAM FAIR was exceedingly well attended by business men, but the tendency of prices for all kinds of stock, with the exception of sheep, was downwards, and in consequence not a very large amount of business was done. The show of fat stock was good, but barrens fetched the best prices comparatively. Sheep were scanty, both fat and store, and prices were firm. Of horses there was a larger show, especially of cart-horses, amongst which there were many fine animals, the prices ranging from £30 to £50. Pigs were plentiful, and cheaper than ever known in Wrexham.

YORK FAIR.—Very few lean beasts were shown, and business trifling. A moderate supply of horses had slow demand, at rates much below last Palmsun fair.

IRISH FAIRS—BALLINAKILL: There was a good average display of stock. Prices ruled pretty much as during the past month, and good store stock were in demand. Store pigs sold a shade lower than previously. At ATHLONE FAIR there was large supply of prime cattle, for which there was little demand, in consequence of the absence of Leinster buyers. The supply of pigs was very large, but the demand was slow, and prices were very considerably down from the January fair. CARLOW: There was a good supply of stock, principally stores; but there was a disinclination on the part of graziers to purchase, unless cattle of good quality. Fat stock manifested a downward tendency — some prime lots brought good prices. Mr. Joseph Fishbourne sold two three-year-old stall-fed heifers for £17 per head. Major M'Mahon received for a lot of fat heifers £13 5s. per head. A large lot of stores, two and a half years old, were sold by Mr. B. B. Feltus to P. Maher at £10 per head. Beef may in general be quoted from 50s. to 55s. per cwt. for prime. Strippers and dry cows were numerous, and those of a good quality sold well; inferior classes were not much in request, prices ranged from £13 to £16. Mr. Browne, of Ballyraggan, county Kildare, sold a lot of three-year-olds for £10 12s. 6d. per head; and Mr. Browne, of Corbally, a lot of three-year-old bullocks, at £11 17s. 6d. The sheep fair was thinly supplied, but some lots of excellent quality were exhibited. Mr. Thomas Dowse sold a prime lot (fat) at £3 10s., the top price; Mr. Peter Salter, a lot of wethers at £2 7s. per head. The average price of hoggets was from 35s. to 42s. Store pigs from 20s. to 25s., bonhams 7s. to 12s. per couple.

STALLIONS FOR THE SEASON, 1858.

Name.	Colour.	Age	Pedigree.	Performances.	Principal Performance.	No. of Winners out by	Sire of	Standing at	Apply to	Price.
Acrobat	bay ...	7	by Ithuriel, out of Tour-de-Force, by Sir Hercules	started 19, won 12	won Great Yorkshire Stakes	untried.	——	Denham, Uxbridge	Mr. Wheeler	10 gs., h. b. 5 gs.
Alarm	bay	16	by Venison, out of Southdown, by Defence	started 17, won 13	won Ascot Cup	40	Frantic	Newmarket	Messrs. Barrow..	15 gs.
Alonzo	chesnut	11	by Alpheus, out of Zarina, by Morisco	started 70, won 21	won Doncaster Handicap	untried.	——	Defford, Pershore	W. Hadley	8 gs., h. b. 5 gs.
Ambrose	black ..	9	by Touchstone, out of Annette, by Priam	started 19........	——	1	Orchehill	Burghley, Stamford...	Mr. H. Rose	15 gs.
Annandale......	brown..	16	by Touchstone, out of Rebecca, by Lottery	started 15, won 3	ran second for Derby...	35	Apathy	Halleaths, Lockerbie ..	Mr. R. Scott....	15 gs., h. b. 7 gs.
Archy	bay	19	by Camel, out of Garcia, by Octavian	started 8, won 3	won £1000 at Newmarket	12	Clydesdale	Swallcliffe, Banbury ..	Mr. Gulliver	10 gs., h. b. 5 gs. &c.
Arthur Wellesley	bay	7	by Melbourne, out of Lady Barbara, by Launcelot	started 7, won 1	won T.Y.S., Manchester.	untried.	——	Rawcliffe, York	T. Bateson......	5 gs.
Assayer, The....	brown ..	7	by Melbourne, out of Pickledust, by Launcelot	started 51, won 17½	won Londesborough Cup	untried.	——	Kelso	Mr. Rathie	5 gs., h. b. 3 gs.
Astolfo	bay	7	by Orlando, out of Plenary, by Emilius	started 8, won 1	won £250 at York......	untried.	——	Newbold Pacey, Warwck	J. Clarke	£1 5s.
Augur	chesnut	9	by Birdcatcher, out of Nickname, by Ishmael ..	started 4, won 3	won Champagne Stakes	1	Soothsayer	Beverley	D. Price	10 gs.
Autocrat	bay	7	by Bay Middleton, out of Empress, by Emilius	started 5, won 3	won the New Stakes....	untried.	——	Lymington	——	10 gs.
Backbiter......	brown ..	13	by Gladiator or Don John, out of Scandal, by Selim	started 24, won 5	won Goodwood Stakes ..	untried.	——	Eaton, Chester	——	10 sovs., h. b. 5 sovs.
Barnton	bay	14	by Voltaire, out of Martha Lynn, by Mulatto.	started 3	——	5	Fandango......	Bushey, Hampton Court	——	20 gs.
Bedouin	brown..	—	by an Arabian, dam by Wanderer............	never appeared ..	——	untried.	——	Ashdean, Chichester ..	J. Gilbert	2 gs.
Bessus	brown	7	by Bay Middleton, out of Brown Bess, by Camel	started 1, won 1	won Two-year-old Stakes at Stockbridge	untried.	——	Bushey Paddocks......	——	5 gs.
Bishop of Osnaburgh	black ..	5	by Surplice, out of H.R.H., by Velocipede	started 15, won 4½	won £50 at Newmarket .	untried.	——	Newmarket	Mr. Stephenson..	5 gs., h. b. 3 gs.
Black Doctor ...	black ..	10	by The Doctor, out of Betsy Bird, by Voltaire.	started 48, won 7	won Manchester Cup ..	untried.	——	Newmarket	Messrs. Barrow..	10 gs., h. b. 5 gs.
Black Eagle . ..	black ..	12	by Voltaire, out of Cytherea, by Camel	started 8, won 2½	won £150 at Newmarket	1	Raven	Knighton	Mr. Griffiths....	3 sovs.
Bolingbroke	chesnut	11	by John o' Gaunt, out of Spangle, by Crœsus ..	started 7, won 3	won the Prendergast	1	Freethinker	Windsor..............	Mr. Sparrow	5 gs., h. b. 2 gs.
Bonnie Morn ..	grey....	6	by Chanticleer, out of Forget-me-not, by Hetman Platoff	started 8, won 6	won Champagne Stakes..	untried.	——	Woolston, Nottingham..	——	7 gs., h. b. 3 gs.
Bridgewater	bay	5	by Verulam, out of Jennala, by Touchstone ...	never appeared	——	untried.	——	Trentham, Stafford	J. Hitchcock....	5 sovs., h. b. 2 sovs.
Brocket	bay	8	by Melbourne, out of Miss Slick, by Muley Moloch	started 7, won 3	won Royal Hunt Cup ..	untried.	——	Denham, Uxbridge	Mr. Wheeler....	10 gs., h. b. 5 gs.
Cannobie	bay	5	by Melbourne, out of Lady Lurewell, by Hornsea	started 5, won 2	won Metrop. Handicap	untried.	——	Cawston, Rugby	W. Hemming ..	10 gs., h. b. 5 gs.
Captain Cornish .	chesnut	8	by Iago, dam by Hampton	started 14, won 4	won Chester Welter Cup	untried.	——	Beverley	D. Price.........	1 g.
Chanticleer	grey....	15	by Birdcatcher, out of Whim, by Drone......	started 37, won 21	won Doncaster Cup ...	40	Vengeance	Croft, Darlington......	T. Winteringham	20 gs.
Chatham	chesnut	19	by The Colonel, out of Hester, by Camel......	started 16, won 8½	won the Criterion	25	Sittingbourne ...	Ham, Sussex	——	20 gs.
Codrington......	bay	4	by Womersley, dam by Hampton	started 12, won 1	won £40 at Ripon......	untried.	——	Newton Malton	——	5 gs., h. b. 2 gs.
Confessor	bay	10	by Cowl, out of Forest Fly, by Mosquito......	started 8, won ½	won Great Yorkshire Handicap	1	Blacksmith......	Theobald's Farm Enfield	Mr. Gray	10 gs.
Cotherstone.....	bay	18	by Touchstone, out of Emma, by Whisker	started 11, won 7½	won the Derby	63	Pumicestone	Althorp, Northampton	Mr. Elliott......	10 gs., h. b. 5 gs. (10 mares)
Corœbus........	bay	6	by Slane, out of Gala, by Galaor	started 17, won 4	won Bentinck M. S.	untried.	——	Halliford, Sunbury....	Mr. Carter......	10 gs., h. b. 3 gs.
Cowl	bay	16	by Bay Middleton, out of Crucifix, by Priam ..	started 8, won 5	won Buckenham Stake..	28	Dervish	Leybourne, Maidstone..	Mr. Tweed......	15 gs., h. b. 5 gs.
Cure, The	brown ..	17	by Physician, out of Morsel, by Mulatto	started 26, won 16	won the Claret.........	22	M. D.	Owmby, Brigg	Mr. Ashton	20 gs. (45 mares).
Dagobert	bay	8	by Ion, dam by Langar	started 12, won 3	won Chesterfield Stake .	untried.	——	Tollerton, Easingwold .	Mr. Batty	10 gs. &c., h. b. 2 gs.
Daniel O'Rourke	chesnut	9	by Birdcatcher, out of Forget-me-not, by Hetman Platoff	started 10, won 2	won the Derby	——	——	Sledmere, Malton	Sir T. Sykes	10 gs.
Dear-me!......	bay	8	by Melbourne, out of Ennui, by Bay Middleton	started 45, won 7	won £130 at Goodwood	untried.	——	Harwood, Bolton-le-Moors	Mr. Redhead....	5 gs., h. b. 2½ gs.
De Clare	bay	6	by Touchstone, out of Miss Bowe, by Catton .	started 4, won 3	won Newmarket Stakes.	untried.	——	Cross Keys, York	Mr. Pearson....	7 gs., h. b. 3½ gs.
De Ruyter......	bay	10	by Lanercost, out of Barbelle, by Sandbeck ..	never appeared ..	——	8	Lady Elizabeth .	Castle Archdall, Enniskillen	——	5 gs., h. b. 2 gs.

Drayton	brown	21	by Muley, out of Prima Donna, by Soothsayer	never appeared	—	10	**Bourton**	Orlingbury, Wellingbro'	Mr. Manning	10 gs., h. b. 3 gs.
Dupe, The	brown	8	by Pantaloon, out of Decoy, by Filho-da-Puta	never appeared	—	1	**Marabout**	Scotch Arms, Carlisle	Mr. Blamire	5 sovs., h. b. 2 sovs.
Ellington	brown	5	by The Flying Dutchman, out of Ellerdale, by Lanercost	started 10, won 3	**won the Derby**	**untried.**	—	Willesden	Mr. Phillips	15 gs., &c.
Era, The	bay	18	by Plenipotentiary, dam by Whisker	started 26, won 7	**won the Liverpool Cup**	**3**	**Puncture**	Comblesforth, Selby	Mr. Hepworth	5 gs., h. b. 2 gs.
Ethelbert	chesnut	8	by Faugh a-Ballagh, out of Espoir, by Liverpool	started 10, won 3	**won City and Suburban Handicap**	**untried.**	—	Swallcliffe, Banbury	Mr. Gulliver	10 gs., h. b. 5 gs.
Fallow Buck	bay	13	by Venison, out of Plenary, by Emilius	never appeared	—	**3**	**Deerhound**	Liss, Hants	Mr. W. Ayling	10 gs.
Fandango	bay	6	by Barnton, out of Castanette, by Don John	started 26, won 17	**won the Ascot Cup**	**untried.**	—	Neasham, Darlington	Mr. Cookson	12 gs. (35 mares)
Fazzoletto	bay	5	by Orlando, out of Canezou, by Melbourne	started 6, won 5	**won 2,000 Gs. Stakes**	**untried.**	—	Dringhouses, York	Mr. Pearson	10 gs., h. b. 5 gs.
Fernhill	brown	13	by Ascot, out of Arethusa, by Elis	started 34, won 11	**won Metrop. Handicap**	**3**	**Thornhill**	Owmby, Brigg	Mr. Ashton	7 gs., h. b. 3 gs.
Filho	black	11	by Giovanni, out of Rosalie, by Maple	never appeared	—	**untried.**	—	Newmarket	—	5 gs.
Flacrow	bay	6	by Archy, out of Papilio, by Bay Middleton	started 24, won 9	**won Spencer Plate**	**untried.**	—	Kirby, Tadcaster	Mr. Scott	5 gs.
Flatcatcher	bay	13	by Touchstone, out of Decoy, by Filho-da-Puta	started 26, won 17	**won 2,000 Gs. Stakes**	**39**	**Courtenay**	Roydon, Diss	G. Sturgeon	15 gs.
Flying Buck	bay	8	by Venison, out of Varia, by Lottery	never appeared	—	**untried.**	—	Plompton, Harrogate	Mr. Groves	10 gs.
Flying Dutchman	brown	12	by Bay Middleton, out of Barbelle, by Sandbeck	started 16, won 15	**won the Derby**	**32**	**Ellington**	Rawcliffe, York	T. Bateson	30 gs.
Footstool	bay	15	by the Saddler, out of Trudge, by Tramp	started 21, won 13	**won Swinley Stakes**	**7**	**Oleaster**	Newmarket	Mr. Stephenson	5 gs., h. b. 3 gs.
Freetrader	bay	9	by the Sea, out of Miss Cobden, by Stockport	a Steeple-chase horse	**won Liverpool National.**	**untried.**	—	Cheltenham	Mr. Holman	3 gs.
Gameboy	brown	16	by Tomboy, out of Lady Moore Carew, by Tramp	never appeared	—	**28**	**Trousseau**	Plompton, Knaresbro'	Mr. Groves	10 gs., h. b. 5 gs.
General Williams	bay	4	by Womersley, out of Lady Elizabeth, by Sleight-of-Hand	started 15, won 4	**won 3 Queens' Plates**	**untried.**	—	Bringham, Driffield	Mr. Hudson	gratis
Grecian	chesnut	10	by Epirus, out of Jenny Jumps, by Rococo	started 4, won 2	**won July Stakes**	**untried.**	—	Theobald's Farm, Stockwell	—	10 sovs.
Hazelnut	brown	8	by Nutwith, out of Macremma, by Sultan	started 26, won 7	**won £150 at Manchester**	**untried.**	—	Ashton, Lancaster	W. Robinson	3 gs.
Hermit, The	brown	7	by Bay Middleton, out of Jenny Lind, by Touchstone	started 10, won 5	**won 2,000 Gs. Stakes**	**untried.**	—	Hambleton, Thirsk	Mr. Stebbing	5 sovs.
Hobbie Noble	bay	9	by Pantaloon, out of Phryne, by Touchstone	started 14, won 5	**won New Stakes**	**untried.**	—	The Curragh	—	10 gs.
Hospodar	chesnut	7	by Hetman Platoff, out of Infidelity, by Voltaire	started 36, won 14	**won £240 at York**	**untried.**	—	Gillingwood, Richmond	Mr. Simpson	6 gs., h. b. 3 gs.
His Grace	bay	9	by Oakley, out of Alice, by Camel	started 4, won 1	**won Warwick Trial Stake**	**untried.**	—	Sandle Bridge, Knutsfrd	Mr. Bowden	10 gs., h. b. 5 gs.
Heir of Lynne	chesnut	5	by Galaor, out of Mrs. Walker, by Jereed	started 25, won 12	**won 6 Queens' Plates**	**untried.**	—	Knockhill, Ecclefechan	R. Menzies	10 gs. (20 mares)
Hesse Cassel	chesnut	7	by Robert de Gorham, out of The Landgravine, by Elis	started 6	—	**untried.**	—	Newmarket	Messrs. Barrow	10 gs., h. b. 5 gs.
Idas	bay	16	by Liverpool, out of Marpessa, by Muley	started 24, won 13	**won 2,000 Gs. Stakes**	**4**	**Evington Lass**	Measham, Atherstone	R. Noon	7 gs., h. b. 3 gs.
Idle Boy	chesnut	18	by Harkaway, out of Idle, by Sir Hercules	started 9	—	**6**	**Mary**	Ashton, Lancaster	W. Robinson	25 gs. (40 mares)
Jack Sheppard	bay	6	by Iago, out of daughter of Toscar, by Bay Middleton	started 36, won 10	**won Prince of Wales S.**	**untried.**	—	Eastbury, Berks	Mr. West	2½ gs.
Joe Lovell	bay	17	by Velocipede, out of Cyprian, by Partizan	started 6, won 3	**won Great York Stakes.**	**7**	**Noisy**	Alvediston, Wilts	Mr. W. Day	10 gs., h. b. 5 gs.
King Caradoc	black	10	by Prince Caradoc, out of Miss Julia Bennett by Muley Moloch	started 14, won 2	**won £144 at Malton**	**untried.**	—	Scarbro'	Mr. Stephenson	.gratis, h. b. 2 gs.
King of Trumps	chesnut	9	by Velocipede, out of Mrs. Gill, by Viator	started 47, won 15	**won the Port**	**untried.**	—	York	—	5 gs., h. b. 3 sovs.
Kingston	bay	9	by Venison, out of Queen Anne, by Slane	started 43, won 17½	**won Goodwood Cup**	—	—	Middle Park, Eltham	Mr. Blenkiron	25 gs. (35 mares)
King Tom	bay	7	by Harkaway, out of Pocahontas, by Glencoe	started 6, won 3	**ran second for Derby**	**untried.**	—	Mentmore, Bucks	Mr. Markham	(subs. *full*)
Knight of Gwynne	brown	11	by Gilbert Gurney, out of Seaweed, by Slane	started 17, won 5	**won Newton St. Leger**	**5**	**Slattern**	Clonmulsh, Carlow	—	5 gs.
Knt. of St. George	bay	7	by Birdcatcher, dam by Hetman Platoff	started 13, won 5	**won the St. Leger**	**untried.**	—	Burghley, Stamford	Mr. H. Rose	20 gs.
Koh-i-noor	chesnut	9	by The Libel, out of Miss Kitty Cockle, by Cadland	started 17, won 4	**won Cheshire Stakes**	**untried.**	—	Bushbury, Wolverhampton	Mr. Daly	6 gs., h. b. 3 gs.
Lambton	bay	8	by The Cure, out of Elphine, by Emilius	started 26, won 10½	**won York County Plate**	**untried.**	—	Owmby, Brigg	—	5 gs., h. b. 2½ gs.
Launcelot	brown	21	by Camel, out of Emma, by Whisker	started 10, won 6½	**won St. Leger**	**24**	**Lance**	Lane Paddocks, Sheffield	F. Crofts	10 gs., h. b. 3 gs.
Lebanon	grey	—	Arabian, by a Nejd horse, out of a Zuklawee mare	a good hunter	—	**untried.**	—	Barkway, Herts	Mr. C. Adams	3 gs., h. b. 2 gs.
Leopold	chesnut	9	by Phlegon, out of Marinella, by Soothsayer	started 7, won 2	**won Ascot Vase**	**untried.**	—	Mentmore, Leighton Buzzard	Mr. Markham	5 gs.
Libel, The	brown	16	by Pantaloon, out of Pasquinade, by Camel	started 7, won 3	**won Chester St. Leger**	**14**	**Truth**	Sledmere, Malton	Sir T. Sykes	10 gs., h. b. 3 gs.
Longbow	bay	11	by Ithuriel, out of Miss Bowe, by Catton	started 21, won 13	**won Stewards' Cup**	**untried.**	—	Knowsley, Prescott	T. Forshaw	10 gs., h. b. 5 gs.
Lord of the Isles	bay	6	by Touchstone, out of Fair Helen, by Pantaloon	started 10, won 4	**won 2,000 gs. Stakes**	**untried.**	—	Croft, Darlington	T. Winteringham	12 gs.
Loup-Garou	brown	12	by Lanercost, out of Moonbeam, by Tomboy	started 6, won 1	**received £15 ft.**	**4**	**Lambourne**	Spye, Chippenham	Mr. Cripps	15 gs. (25 mares)

STALLIONS FOR THE SEASON 1858—(*Continued*).

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of winners out by.	Sire of	Standing at	Apply to	Price.
Mandricardo	chesnut	7	by Orlando, out of Duvernay, by Emilius	started 8, won 2	won £75 at Kelso	untried.	—	Knockhill, N.B.	R. Menzies	5 gs.
Marley Hill	brown	7	by Melbourne, out of Mowerina, by Touchstone	started 4, won 1	won £220 at Newcastle	untried.	—	Skerne, Driffield	Mr. Stockdale	5 gs., h. b. 2 gs.
Marsyas	chesnut	7	by Orlando, out of Malibran, by Whisker	started 7, won 3	won July Stakes	untried.	—	Middle Park, Eltham	Mr. Blenkiron	6 gs., h. b. 3 gs.
Mentor	black	17	by Sheet Anchor, out of Calypso, by Orville	started 19, won 4	won Liverpool St. Leger	1	Queen of the South	Lane Paddocks, Sheffield	F. Crofts	10 gs., h. b. 3 gs.
Midas	chesnut	10	by Beiram, out of Merope, by Voltaire	started 25, won 9	won Newmarket St. Leger	untried.	—	Burghley, Stamford	Mr. H. Rose	10 gs.
Middlesex	brown	7	by Melbourne, out of Evening Star, by Touchstone	started 6	—	untried.	—	Mentmore, Bucks	Mr. Markham	5 gs.
Mildew	chesnut	11	by Slane, out of Semiseria, by Voltaire	started 21, won 10	won Ascot Vase	3	Plague Royal	Richmond, York	R. Wright	10 gs., h. b. 2 gs.
Moorcock	brown	16	by Heron, dam by Young Phantom	started 8, won 4	won a Plate	untried.	—	Whitehall, Wootton-under-Edge	Mr. Pick	5 gs., h. b. 3 gs.
Morpeth	brown	17	by Muley Moloch, dam by Cervantes	started 33, won 21	won Northampton St.	—	—	Beverley, &c.	Mr. Ellerington	7 gs., h. b. 2 gs.
Mountain Deer	bay	10	by Touchstone, out of Mountain Sylph, by Belshazzar	started 20, won 6	won the Criterion	—	—	Dean's Hill, Stafford	Mr. Painter	10 gs.
Mr. Stiggins	black	6	by Muley Moloch, out of Chloris, by Bay Middleton	never appeared	—	untried.	—	Nun Monkton, York	Mr. Cundall	10 gs., h. b. 3 gs.
Muscovite	bay	9	by Hetman Platoff, dam by Camel	started 10, won 2	won Cesarewitch	untried.	—	Euxton, Lancaster	R. Harris	10 gs., h. b. 3 gs.
Neasham	bay	10	by Hetman Platoff, out of Wasp, by Muley Moloch	started 10, won 3	won Northumberland P.	2	Heroine	Middle Park, Eltham	Mr. Blenkiron	8 gs., h. b. 4 gs.
Neville	bay	7	by Napier, out of Sally Snobs, by Sandbeck	started 16, won 7	won Gt. Northern Hand.	untried.	—	Catterick	Mr. Hutchinson	8 gs., h. b. 3 gs.
Newcourt	bay	15	by Sir Hercules, out of Sylph, by Spectre	started 19, won 8	won Hereford Stakes	1	Cotswold	Althorp, Northampton.	Mr. Elliott	5 gs., h. b. 3 gs.
Newminster	bay	10	by Touchstone, out of Beeswing, by Dr. Syntax.	started 10, won 2	won St. Leger	—	—	Rawcliffe, York	T. Bateson	15 gs.
Ninus	bay	11	by Dromedary, dam by Mulatto	started 24, won 13	won Stamford Cup	untried.	—	Grasmore, March.	—	10 gs., h. b. 2 gs.
Nutpecker	brown	8	by Nutwith, out of Amina, by Sultan	started 19, won 6	won Drawing Room S.	untried.	—	Upton, Stratford	—	5 gs., h. b. 3 gs.
Nutwith	bay	18	by Tomboy, dam by Comus	started 7, won 3	won St. Leger	25	Cobnut	Burghley, Stamford	Mr. H. Rose	25 gs.
Omer Pasha	bay	—	an Arabian—Seglavée Djederanee	never appeared	—	untried.	—	Althorp, Northampton	Mr. Elliott	2 gs.
Orestes	bay	8	by Orlando, dam by Bay Middleton	started 23, won 9	won Woodcote Stakes	untried.	—	Plompton, Knaresbro'.	Mr. Groves	10 gs.
Orpheus	chesnut	9	by Orlando, out of Malibran, by Whisker	started 28, won 6	won Granby Handicap	untried.	—	Boynton, Bridlington	—	5 gs., h. b. 2 gs.
Oulston	bay	6	by Melbourne, out of Alice Hawthorn, by Muley Moloch	started 11, won 7	won Queen's Vase	untried.	—	Cawston, Rugby	Mr. Hemming	10 gs., h. b. 5 gs.
Paletot	brown	6	by Touchstone, out of Canezou, by Melbourne	started 13, won 4	won £1300 at Newmarket	untried.	—	Knowsley, Prescott	T. Forshaw	6 gs., h. b. 3 gs.
Papageno	chesnut	7	by Birdcatcher, out of Sister to Wanota, by Simoom	started 2, —	—	untried.	—	East Challow, Berks	J. Manning	5 gs., h. b. 2½ gs.
Pelion	brown	8	by Ion, out of Ma Mie, by Jerry	started 16, won 8	won Eglinton Stakes	untried.	—	Danebury	—	10 gs.
Peppermint	brown	9	by Sweetmeat, out of Pantalonade, by Pantaloon	started 5, won 2	won Bedford 2-yr.-old S	2	Mainstay	Sidebotham, Tarporley	F. Lawrence	10 gs., h. b. 3 gs.
Phlegon	bay	18	by Beiram, out of Lucetta, by Reveller	started 6, won 2	won G. Duke Michael S.	12	Leopold	Burghley, Stamford.	Mr. H. Rose	10 gs.
Planet	bay	14	by Bay Middleton, out of Plenary, by Emilius	started 9, won 4	won Molecomb Stakes	10	Ceres	Roydon, Diss	G. Sturgeon	10 gs.
Pontifex	bay	11	by Touchstone, out of Crucifix, by Priam	never appeared	—	3	Squire Watt	Great Driffield	Mr. Howden	5 gs.
Poynton	bay	15	by Touchstone, out of Lady Stafford, by Comus	started 6, won 2	won Great York S.	10	Lady Vernon	Crown & Thistle, Manch.	Mr. Hardbron	6 gs., h. b. 3 gs.
Prime Minister	brown	10	by Melbourne, out of Pantalonade, by Pantaloon	started 31, won 8	won the Port	untried.	—	Childwick, St. Albans	Mr. Mather	5 gs., h. b. 2½ gs.
Pyrrhus the First	chesnut	15	by Epirus, out of Fortress, by Defence	started 13, won 10	won the Derby	29	Virago	Willesden	Mr. Phillips	30 gs.
Quince	chesnut	7	by Slane, out of Preserve, by Emilius	started 27, won 4	won Goodwood Stakes.	untried.	—	Theobalds Farm, Enfield	Mr. Gray	10 gs.
Ratan	chesnut	17	by Buzzard, dam by Picton	started 7, won 3	won the Criterion	14	Penang	Alvediston, Wilts	H. Randall	10 gs.
Rataplan	chesnut	8	by The Baron, out of Pocahontas, by Glencoe	started 71, won 42	won 21 Royal Plates	untried.	—	Tickhill Castle Farm	W. Hornshaw	25 gs. (40 mares)
Rattle	chesnut	8	by The Fallow Buck, out of The Hamble, by Camel	started 7	—	untried.	—	Audler's Ash. Liss.	Mr. Ayling	8 gs.
Red Hart	bay	13	by Venison, out of The Colonel's Daughter, by The Colonel	started 16, won 8	won Duke Michael S.	5	Zaidee	The Curragh	—	6 gs., h. b. 3 gs.
Retriever	chesnut	22	by Recovery, out of Taglioni, by Whisker	started 53, won 24	won Goodwood Stakes.	11	Remunerator	Water Tower, Rugby	Mr. Walker	5 gs.
Rifleman	bay	6	by Touchstone out of Camp Follower, by The Colonel	started 16, won 8	won Great York S.	untried.	—	Sledmere, Malton	Sir T. Sykes	15 gs.
Robert de Gorham	brown	19	by Sir Hercules, out of Duvernay, by Emilius	started 20	ran 2nd for the Derby	27	Sir Colin	Ham, Sussex	—	20 gs.
Rochester	black	12	by Chatham, out of Margravine, by Little John	started 17, won 5	won £275 at Newmarket	4	Persia	Fountain, Bedford	Mr. Ward	6 gs., h. b. £2 5s.

Roland	bay	13	by The Saddler, out of Executrix, by Liverpool	started 15, won 2	won Wolverhampton St.	untried.	—	Plompton, Harrogate	Mr. Groves	7 gs.
Saucy Boy	—	—	by Arthur, dam by Mameluke	a Steeple-chase horse	won the Caen St.-Chase	untried.	—	Willesden Paddocks	Mr. Phillips	5 gs., h.b. 3 gs.
Sir John Barleycorn	brown	9	by Ismael or the Baron, out of Loveslip, by Camel	started 4	—	untried.	—	Skirmet, Henley-on-Thames	Mr. Hussey	2½ gs.
Sir Peter Laurie	bay	14	by The Saddler, out of Well-a-day, by Priam	winner of many	steeple-chases	untried.	—	Cheltenham	Mr. Holman	5 gs. (45 mares)
Sir Tatton Sykes	bay	15	by Melbourne, dam by Margrave	started 12, won 4	won St. Leger	14	Mr. Sykes	Turf Tavern, Doncaster	W. King	10 gs.
Slane	bay	25	by Royal Oak, dam by Orville	started 18, won 9	won Waterloo Shield	112	The Princess	Rawcliffe, York	T. Bateson	20 gs.
Spanish Jack	brown	15	by Don John, out of Miss Lydia, by Walton	started 3, won 1	won £70 at Newton	2	Donna	Beckenham	Mr. Schillio	6 gs., h. b. 3 gs.
Speed the Plough	brown	8	by Cotherstone, out of Farmer's Daughter, by Muley Moloch	started 53, won 12	won the Criterion	untried.	—	Warfield, Berks	B. Bond	6 gs., h. b. 3 gs.
Spencer	bay	6	by Cotherstone, out of Polka, by Emilius	started 5	—	untried.	—	Thirkleby, Thirsk	Mr. Nanfield	5 gs., h. b. 2 gs.
St. Lawrence	brown	21	by Skylark or Lapwing, out of Helen, by Blacklock	started 58, won 28	won the Chester Cup	14	Sancebox	Lowfold, Petworth	Mr. Scutt	10 gs., h. b. 5 gs.
St. George	bay	17	by Ishmael, out of Whim, by Drone	ran well in Ireland	—	—	—	Holcombe, Somerset	Mr. Langworthy	£2 10s.
Stockwell	chesnut	9	by The Baron, out of Pocahontas, by Glencoe	started 21, won 12	won St. Leger	untried.	—	Kirkby, Tadcaster	Mr. Scott	30 gs. (40 mares, *full*)
Storm	bay	10	by Touchstone, out of Ghuznee, by Pantaloon	started 2, won 1	won £460 at Doncaster	8	Stormsail	Redlands, Reading	Mr. Lediard	10 gs.
Student, The	chesnut	7	by Chatham, dam by Laurel	started 11, won 4	won £350 at Newmarket	untried.	—	Findon, Worthing	Mr. Mitchell	10 gs.
Sweetmeat	brown	16	by Gladiator, out of Lollypop, by Starch	started 24, won 22½	won Queen's Vase	27	Mincemeat	Stanton, Shiffnall	Mr. Eyke	10 gs. (30 mares)
Swindler, The	chesnut	6	by Epirus, out of Fraudulent, by Venison	started 3	—	untried.	—	Alvediston, Wilts	H. Randall	7 gs., h. b. 3½ gs.
Sultan	chesnut	6	by Crescent, out of Madame Vestris, by Distingué	started 11, won 6	won Cambridgeshire	untried.	—	Theobald's Farm, Enfield	Mr. Gray	10 gs.
Surplice	brown	16	by Touchstone, out of Crucifix, by Priam	started 16, won 9	won the Derby	25	Sidney	Turf Tavern, Doncaster	Messrs. Weatherby	15 gs. (40 mares)
Tadmor	brown	12	by Ion, out of Palmyra, by Sultan	started 11, won 8	won Gratwicke Stakes	8	Tyre	Roydon, Diss	G. Sturgeon	15 gs.
Teddington	chesnut	10	by Orlando, out of Miss Twickenham, by St. Giles	started 18, won 10	won the Derby	2	Maid of Masham filly	Easby, Richmond	Mr. Jaques	20 gs. (26 mares)
Tempest	brown	5	by Melbourne, out of Meanee, by Touchstone	never appeared	—	untried.	—	Newton Purcell, Oxon.	Mr. Crawford	5 gs., h. b. 2½ gs.
Theon	brown	16	by Emilius, out of Maria, by Whisker	started 6, won 3	won Doncaster Two-yr. S.	17	Alcoran	Boston	Mr. P. Smith	3 gs.
Trapper, The	bay	7	by Ion, out of Prairie Bird, by Gladiator	started 6, won 5	won Duke Michael S.	untried.	—	Theobald's Farm, Enfield	Mr. Gray	10 gs.
Turnus	bay	12	by Taurus, out of Clarissa, by Defence	started 5, won 3	won Chesterfield Cup	8	Hamlet	Warfield, Berks	B. Bond	10 gs., &c.
Ugly Buck	bay	17	by Venison, out of Monstrosity, by Plenipotentiary	started 5, won 3	won 2,000 gs. Stakes	18	Ammonia	Berry Hill, Stoke-on-Trent	Mr. Parlby	5 gs., h. b. 2½ gs.
Vanderdecken	brown	8	by Bay Middleton, out of Barbelle, by Sandbeck	started 18, won 4	won Cheshire Stakes	untried.	—	Theobald's Farm, Enfield	Mr. Gray	10 gs.
Van Galen	brown	5	by Van Tromp, out of Little Casino, by Inheritor	started 4, won 1	won Tyro Stakes	untried.	—	Middleham	Mr. Fobert	10 gs.
Vatican	bay	12	by Venison, out of Vat, by Langar	started 27, won 11	won Newmarket S.	untried.	—	Hambleton, Thirsk	Mr. Stebbing	5 sovs., h. b. 3 sovs.
Vengeance	—	—	a Barb	won many races at	Gibraltar	—	—	Bushbury, Wolverhampton	Mr. Daly	5 gs., h. b. 3 gs.
Vengeance	bay	6	by Chanticleer, dam by The Saddler	started 21, won 7	won Cesarewitch	untried.	—	Theobald's Farm, Enfield	Mr. Gray	10 gs.
Vindex	bay	8	by Touchstone, out of Garland, by Langar	started 40, won 13	won Champagne S.	untried.	—	Owmby Brigg	Mr. Ashton	10 gs., h. b. 4 gs.
Voltigeur	brown	11	by Voltaire, out of Martha Lynn, by Mulatto	started 11, won 5	won the Derby	5	Vedette	Middlethorpe, York	Mr. Smallwood	30 gs.
Volunteer	bay	6	by Ithuriel, out of Abaft, by Sheet Anchor	started 1	—	untried.	—	Ashton, Lancaster	W. Robinson	3 gs.
Vortex	brown	9	by Voltaire, out of Martha Lynn, by Mulatto	started 3	—	untried.	—	Northampton	Mr. Merrick	5 gs., h. b. 3 gs.
Weatherbit	brown	16	by Sheet Anchor, out of Miss Letty, by Priam	started 8, won 3	won Four-year-old S.	24	Weathergage	Easby, Richmond	Mr. Jaques	15 gs.
West Australian	bay	8	by Melbourne, out of Mowerina, by Touchstone	started 11, won 10	won the Derby	untried.	—	Kirkby, Tadcaster	Mr. Scott	30 gs. (40 mares)
Whitelock	brown	7	by Ratan, out of Miss Martin, by St. Martin	started 33, won 10	won Northumberland P.	untried.	—	Childwick, St. Albans	Mr. Mather	1 gn.
Wild Dayrell	brown	6	by Ion, out of Ellen Middleton, by Bay Middleton	started 4, won 3	won the Derby	untried.	—	Chilton Foliatt, Hungerford	Mr. Rickaby	30 gs.
Windhound	brown	11	by Pantaloon, out of Phryne, by Touchstone	started 6, won 1	won £74 at Reading	6	Arminius	Russky, Hungerford	Mr. Dawson	10 gs., h. b. 5 gs.
Windischgratz	bay	10	by Jeremy Diddler, out of Medea, by Whisker	started 13, won 2	won Goodwood Stakes	untried.	—	Castle Archdall, Enniskillen	—	5 gs., h. b. 2 gs.
Wood-Pigeon	bay	16	by Velocipede, out of Amina, by Sultan	started 17, won 7	won Ascot Stakes	4	Turbit	Burghley, Stamford	Mr. H. Rose	15 gs.
Woolwich	chesnut	11	by Chatham, out of Clementina, by Actæon	started 48, won 18	won Ascot Cup	3	Greenwich Fair	Bodicott Paddocks	W. Mace	10 gs., h. b. 3 gs.
Yellow Jack	chesnut	5	by Birdcatcher, out of Jamaica, by Liverpool	started 7, won 1	ran second 6 times	untried.	—	Newmarket	Messrs. Barrow	11 gs.

The Groom's Fee, if not included, varies from a Guinea to Half-a-Crown. We are not answerable for all the Performances of, or Stock out by, Irish Horses.

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

The month of March has exhibited extraordinary differences of temperature. The first fortnight was a continuation of the sternness with which February closed; but immediately afterwards a brilliant spring-time commenced, with a warmth occasionally oppressive, and an almost entire absence of rain. Field-work was immediately resumed, and the sowing of Lent corn, which had been interrupted by the severe frost, has proceeded most favourably. Whatever damage was done to the wheat and other autumn-sown corn by the cutting winds must soon be apparent, but as respects the principal grain very little harm has been yet reported beyond what might have been expected on exposed and light lands, from the want of a snow covering. The dryness of the whole season, and the general appearance of the plants, are favourable to future prospects. The uncertainty of politics at the outset of the month seemed a check upon business, but the renewed assurances of peace, followed by the most propitious weather, and a liberty to export wheat in the Papal States, have combined, towards the month's close, to somewhat reduce prices, and the value in the London market has receded about 4s. per qr. On all hands it is allowed that good stocks exist throughout the country; and if, with a steady importation from abroad, farmers show an anxiety to sell, and overdo the markets at a time when the spririt of speculation is entirely wanting, there can be but one result, viz., a still lower range than what is now obtaining. One thing is however certain, that the reduction in value greatly increases consumption; and the largest importations and lowest rates have invariably been followed by scarcity and dearness, and the safety of holding must be proportioned to the moderation of prices.

In the Baltic the season was commenced with empty garners, and the produce of 1857 in these quarters is consequently reported to be below an average; and should any drought occur this year in these fertile provinces, they may require an importation: while Spain continues in this position, and is likely to remain so till her new crop is gathered. Neither Odessa or the United States have yet shaped their course by the English markets, though doubtless supplies will come on thence for the chance of improvement here, but not at the rates suggested by interest or apprehension, for old wheat has become a scarcity both in the old world as well as the new one; and while it behoves us never to mistrust an overruling Providence, it is well to remember that the blade on the ground is not the sheaf in the barn. The importation from the Papal States is not permitted beyond the end of May, and should prices rise materially before then, would be suspended. In Southern Europe and Algeria the wheat crop at present looks well, but in the North some fears have been felt, as the consequence of the great changes and exposure.

The following were the recent quotations of wheat in different foreign ports:—At Paris the finest quality is quoted 41s., and Antwerp notes 42s. 9d. per qr. as a top price. Polish wheat at Amsterdam brought 56s. per qr. The best quality on the spot at Hamburgh was held at 45s. The rate at Stettin was 40s. 6d., and at Berlin 41s. 6d. Ghirka and Polish wheat at Odessa was still worth 43s. per qr. Low Saidi wheat at Alexandria had sold at 27s. 9d. Berdianski quality, at Leghorn, was held at 44s. per qr. At Alessandria, in Piedmont, top price was 41s. for soft wheat. Barcelona quotations were still as high as 52s. 8d. per qr. New York, by last accounts, was firmer; the price of good red there was 1 d. 25 c., equal to 43s. per qr.; Southern white 1 d. 30 c. to 1 d. 52½ c., equal to 44s. 8d. to 52s. per qr.

The foreign importations into United Kingdom for the two months ending February 28th, 1858, were 606,394 qrs. of wheat, and 613,860 cwt. of flour.

The first Monday commenced on a small supply of foreign wheat, and a moderate one of English; from the near counties, during the morning, the samples were but few. The weather was then extremely cold, and the condition being improved, it went off steadily at the prices of the previous week; there was also a fair retail demand for foreign. In the country there were but slight changes: Hull, Manchester, Birmingham, and Bristol were firm; Lincoln and Louth were 1s. dearer, but a few markets equally declined; Liverpool, being over-supplied with French wheat, was 2d. per 70 lbs. cheaper. Friday's market there underwent no farther change, and the London trade remained quiet to the week's end.

The second Monday was still less liberally supplied from abroad, and what arrived was chiefly from Antwerp; of our own growth, the quantity was moderate. The morning's supply from Kent was good, from Essex insignificant; the business done was effected slowly, but there was a pretty general clearance, at full prices; foreign samples being unchanged. No particular change took place in subsequent country markets: Leeds and Hull were firm, but Birmingham scarcely obtained former rates; Liverpool had but a thin attendance both on the Tuesday's and Friday's market, and no alteration of quotations was noted.

The third Monday had an increased supply of foreign, with rather more English; the near counties also during the morning sent up rather more samples, and the weather having completely changed, with some appearance of permanence, there was less disposition to buy on the part of millers. Early in the morning at the Kentish stands some choice parcels were quitted at quite as good prices, but it was afterwards difficult to place without a small concession. The foreign trade was heavy without change. Several of the country markets responded to the London reports by accepting a decline of 1s., among them were Birmingham, Wakefield, and Bristol, while Wolverhampton and Chelmsford quoted a fall of 1s. to 2s. No reports were cheerful, the majority merely indicating a heavy state of trade. French wheat was again rather cheaper at Liverpool on Tuesday, but Friday's report only noted a small attendance, and retail trade. London was then certainly tending to lower rates.

The fourth Monday occurring after a week's very fine weather, with fair supplies both English and foreign, did not require a large quantity from the near counties to make a heavy market, especially as there was a liberal arrival of American flour. Though Kent and Essex scarcely sent an average quantity, millers held off, and notwithstanding factors were willing to take a reduction of 2s. per qr., only a small portion was sold on these terms, an apprehension apparently prevailing that the breaking up of the frost would soon largely increase the arrivals from abroad. The foreign trade was in a state of stagnation, sales being only possible in retail at a similar decline. In the country about a similar decline took place: Hull, Lynn, St. Ives, Gainsbro', Birmingham, Wolverhampton, Manchester, and Bristol were all 1s. to 2s. lower, Louth giving way 2s. to 3s. per qr. Liverpool, on Tuesday, was 1d. per 70 lbs. cheaper, with a very small business; but Friday was dull, without change.

The fifth Monday had very short supplies from Kent and Essex, but an extreme dulness prevailed, and prices further receded 2s. per qr.

The arrivals into the port of London during the five weeks referred to were 24,580 qrs. English; 29,551 qrs. foreign; giving a weekly average of 10,826 qrs., and showing a decrease as compared with February, of 1,703 qrs. per week; the falling off being only in foreign qualities.

The flour trade has been in keeping with that of wheat; the top price of Town-made was reduced on the 5th Monday to 40s.; Norfolks were unchanged till the fourth Monday, when they were reduced from the nominal rate, 32s. to 30s. per sack, with a very limited sale at the quotations. French and American also on this day receded fully 1s. per sack and brl.; the arrivals of the latter being larger than during any week since the 14th of December, 1857. The closing price of Norfolk was 29s. The supplies from the country have been constantly large, and have greatly interfered with the wheat trade, London millers being thus undersold.

During the five weeks, the receipts have been 93,921 sacks of country made; 8,311 sacks French, &c., and 26,704 brls. American; giving a weekly average of 20,440 sacks and 5,340 brls.

In barley throughout the month there has been scarcely any alteration, London having been very moderately supplied with really fine malting quality, and the seed demand running through the month has taken off all choice lots at full rates. From abroad also less has come to hand, the heavy supplies of low Mediterranean sorts having ceased, and those that were previously stored having been partly worked off in mixture with oats, as cheaper food. Our own stocks of this grain getting reduced, there seems every prospect that whatever foreign arrivals appear they will find a sale, or not remain long in store.

The arrivals during the five weeks have been, in English 17,087 qrs., in foreign 29,075 qrs., making an average of 9,231 qrs. per week, against 13,726 qrs. weekly in February.

The malt trade has been little altered, fair supplies being kept up, and about the same prices realized from the beginning of the month to its close for fine qualities.

The oat trade has been remarkably steady, on short arrivals scarcely any quotable change occurring, and the cause of this grain's not advancing can only be found in the quantity of Russian landed during former gluts, which have served to feed the market in the absence of ship samples. Had it not been, however, for increased supplies from Ireland, it would have been impossible to keep prices down, and even with their help cargoes of sweet Riga and Petersburg qualities have been held at rather more money. From Scotland as well as from foreign ports the supplies have been reduced. On the fifth Monday prices improved 6d. per qr.

The receipts during five weeks have been 5,317 qrs. English, 6,503 qrs. Scotch, 21,880 qrs. Irish, and 27,366 qrs. foreign, giving a total weekly average of only 12,213 qrs., which is 4,991 qrs. weekly below February arrivals.

Beans and peas, in the comparative absence of foreign supplies, till the last week have rather improved in value, especially the former, to the extent of 1s. to 2s. per qr. Boiling peas, which slowly found favour in the cold weather, have again upon its ceasing diminished in consumption: maples and duns remaining scarce have commanded good prices from retail buyers, who prefer them to cheaper substitutes. Of English beans the quantity received has been 4,785 qrs., of foreign 4,593 qrs. Of foreign peas there were only 105 qrs., and 1,663 qrs. English.

In linseed there has been little change: the first Monday of the month noted a rise of 1s., and at this improvement the market has remained with a quiet trade; but cakes all through have been much in request, and notwithstanding some large supplies recently received from the United States, they have commanded about former prices.

The cloverseed trade, checked at first by the frost, on the return of fine weather did not meet the expectation of holders; the season getting late, those who have stocks of foreign have been uneasy at the slackness of the demand, especially as it appears that the first reports of the English crop were below the reality. A good deal of red seed it now appears was produced, but part of it being badly harvested, the extent of the injury was exaggerated, the bulk being fit for sowing, though discoloured; and as the farmers have not received high prices for their wheat, they have been less disposed to buy too dearly. A fair trade came at the month's close, however, at lower rates; and great prices are not now to be looked for, either in red or white seed, or trefoil. Canaryseed had a start during the intense frost, but with mild weather it seems likely again to recede, as the Dutch ports must have some to spare at present prices; and Hambro', now free, is likely to send some spring tares, which have been scarce and dear. Rapeseed has been a better sale, the plants being reported abroad as partly injured. Mustard, hempseed, carraway, coriander, &c., have very little varied during the month's course.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, new, Essex and Kent, white	40	to 48	red	38	to 44
Norfolk, Linc. and Yorks., red				37	43
BARLEY, malting	35	to 38	Chevalier, new	38	41
Distilling	32	35	Grinding	26	30
MALT, Essex, Norfolk, and Suffolk	58	66	extra	68	—
Kingston, Ware, and town made	58	66	,,	68	—
Brown	54	56		—	—
RYE	—	—		30	34
OATS, English, feed	20	23	Potato	25	32
Scotch, feed	20	25	Potato	24	31
Irish, feed, white	20	22	fine	24	30
Ditto, black	19	21	,,	—	24
BEANS, Mazagan	32	35	Ticks	33	34
Harrow	33	36	Pigeon	37	42
PEAS, white boilers	40	44	Maple .. 41 43..Grey	39	41
FLOUR, per sack of 280lbs., Town, Households..33s.			fine	37	40
Country	30	31	Households	34	35
Norfolk and Suffolk, ex-ship				28	29

FOREIGN GRAIN.

Shillings per Quarter.

WHEAT, Dantzic, mixed	44	—	high do. — — extra	—	51
Konigsberg	40	46	,, — —	—	—
Rostock	42	—	fine 47 —	—	—
American, white	42	48	red 40 45	—	—
Pomera., Meckbg., & Uckermrk, red	42	45		—	—
Silesian, red	40	42	white	41	44
Danish and Holstein				38	42
Russian, hard	40	44	French..40 42 white	45	—
St. Petersburg and Rigs				40	43
Rhine and Belgium				—	45
BARLEY, grinding	24	29	Distilling	33	34
OATS, Dutch, brew, and Polands	21	28	Feed	20	25
Danish and Swedish, feed	21	25	Stralsund	22	25
Russian				20	22
BEANS, Friesland and Holstein				34	35
Konigsberg	31	35	Egyptian	33	34
PEAS, feeding	37	40	fine boilers	40	42
INDIAN CORN, white	34	35	yellow	34	35
FLOUR, per sack, French	34	37	Spanish	—	—
American, per barrel, sour	18	20	sweet	22	23

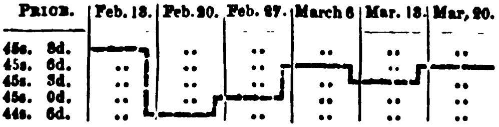
IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS:	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Feb. 13, 1858	45	8	36	8	22	8	30	9	39	3	41	1
Feb. 20, 1858	44	6	35	9	22	10	34	8	38	2	40	2
Feb. 27, 1858	45	0	35	11	22	4	35	0	38	4	40	6
March 6, 1858	45	6	36	7	23	4	34	0	37	11	41	0
March 13, 1858	45	3	36	6	23	8	31	3	37	11	41	2
March 20, 1858	45	6	36	9	23	4	31	9	37	11	41	0
Aggregate average	45	3	36	4	23	0	32	10	38	3	40	10
Sametime last year	55	9	45	8	23	7	40	3	39	5	39	5

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat	113,805 qrs.	45	6	Wheat	106,868 qrs.	55	10
Barley	68,271	36	9	Barley	51,261	46	8
Oats	14,162	23	4	Oats	15,095	24	4
Rye	94	31	9	Rye	108	38	10
Beans	6,151	37	11	Beans	6,695	39	8
Peas	1,482	41	0	Peas	1,424	39	2

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



PRICES OF SEEDS.

BRITISH SEEDS.

CLOVERSEED, red 40s. to 60s., extra —s., white	50s. to 75s.
TREFOIL	18s. to 23s.
TARES, Winter, new, per bushel	5s. 0d. to 6s. 0d.
MUSTARDSEED, per bush., new 15s. to 17s., brown	13s. to 15s.
CORIANDER, per cwt.	20s. to 26s.
CANARY, per qr.	84s. to 94s.
LINSEED, per qr., sowing —s. to —s...crushing	61s. to 63s.
LINSEED CAKES, per ton	£10 0s. to £10 10s.
RAPESEED, per qr.	68s. to 72s.
RAPE CAKE, per ton	£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

CLOVERSEED, red 50s. to 60s., white	50s. to 75s.
TREFOIL	17s. to 22s.
TARES, Spring, per bushel	7s. 0d. to 7s. 6d.
HEMPSEED, small, per qr. Dutch	42s. to 47s.
CORIANDER, per cwt.	17s. to 26s.
CARRAWAY ,,	44s. to 46s.
LINSEED, per qr., Baltic 59s. to 60s.....Bombay	58s. to 60s
LINSEED CAKE, per ton	£10 0s. to £10 15s
RAPESEED, Dutch	66s. to 72s.
RAPE CAKE, per ton	£5 0s. to £5 10s.

HOP MARKET.

LONDON, MONDAY, March 29.—The demand for Hops continues exceedingly heavy, and where sales are effected to any extent somewhat lower rates are submitted to. Our currency is as follows—

Mid and East Kents	70s. to 90s.,	choice 112s.
Weald of Kents	54s. to 60s.	,, 66s.
Sussex	52s. to 54s.	,, 60s.
Yearlings &c.	21s. to 35s.	,, 50s.

CHICORY.

LONDON, SATURDAY, March 27.—There is rather more business doing both in English and foreign Chicory, and, in some instances, prices have an upward tendency. The supply on offer is only moderate.

	£	s.		£	s.		£	s.		£	s.
ENGLISH, per ton	£10	0	to	£0	0	ANTWERP	£10	0	to	£11	0
HARLINGEN	10	15		11	0	DACKUM	0	0		0	0
BRUGES	10	15		11	0	GUERNSEY	10	10		10	15
HAMBURG	11	0		11	10	BELGIUM	10	10		11	0

HAY MARKETS.

SATURDAY, March 27.—SMITHFIELD.—A fair average supply, and a moderate demand.

CUMBERLAND.—Supply tolerably good, and trade rather dull.

WHITECHAPEL.—Both hay and straw moved off slowly, at our quotations.

At per Load of 36 Trusses.

	SMITHFIELD.		CUMBERLAND.		WHITECHAPEL.	
MEADOW HAY	50s. to	85s.	56s. to	84s.	50s. to	84s.
CLOVER DITTO	70s.	100s.	70s.	106s.	70s.	100s.
STRAW	24s.	30s.	25s.	30s.	26s.	30s.

POTATO MARKETS.

SOUTHWARK WATERSIDE, MONDAY, March 29.—Since our last export supplies have been light coastwise, but heavy from foreign ports. Our markets having been previously pretty clear, there was a ready demand all last week at much the same prices as quoted on Monday the 22nd inst. The following are this day's quotations:—

Yorkshire Regents	140s. to 190s.	per ton.
Lincolnshire do.	140s. to 160s.	,,
Dunbar do.	140s. to 180s.	,,
Do. reds	90s. to 100s.	,,
Perth, Fife, and Forfar Regents	100s. to 145s.	,,
Ditto ditto reds	90s. to 100s.	,,
French whites	80s. to 95s.	,,
Belgian do.	80s. to 90s.	,,
Ditto reds	100s. to 105s	,,

BOROUGH AND SPITALFIELDS.

LONDON, MONDAY, March 29.—The arrivals of potatoes, coastwise and by railway, last week, were moderate. The imports were 1,005 tons from Antwerp, 826 tons from Rouen, 837 tons from Dunkirk, 47 tons from Ostend, 80 tons from Tornenzen, 265 tons from Ghent, 270 tons from Calais, and 110 tons from Louvaine. Selected samples are firm and rather dearer, and the value of other kinds is fairly supported.

York Regents	140s. to 200s.	per ton.
Kent and Essex do.	100s. to 160s.	,,
Scotch	120s. to 170s.	,,
Do. Cups	100s. to 110s.	,,
Middlings	60s. to 120s,	,,
Foreign	80s. to 100s.	,,

COUNTRY POTATO MARKETS.—YORK, March 20: Potatoes sell at 13d. to 14d. per peck, and 4s. to 4s. 3d. per bushel. LEEDS, March 23: We had a middling show of potatoes, which sold at 16d. to 16½d. per 21lbs. wholesale, and 17d. to 18d. retail. RICHMOND, March 20: Potatoes, 4s. 8d. per bushel. SHEFFIELD, March 23: Potatoes sell at 12s. to 18s. per load of 18 stones. MANCHESTER, March 25: Potatoes, 12s. to 19s. per 252lbs.

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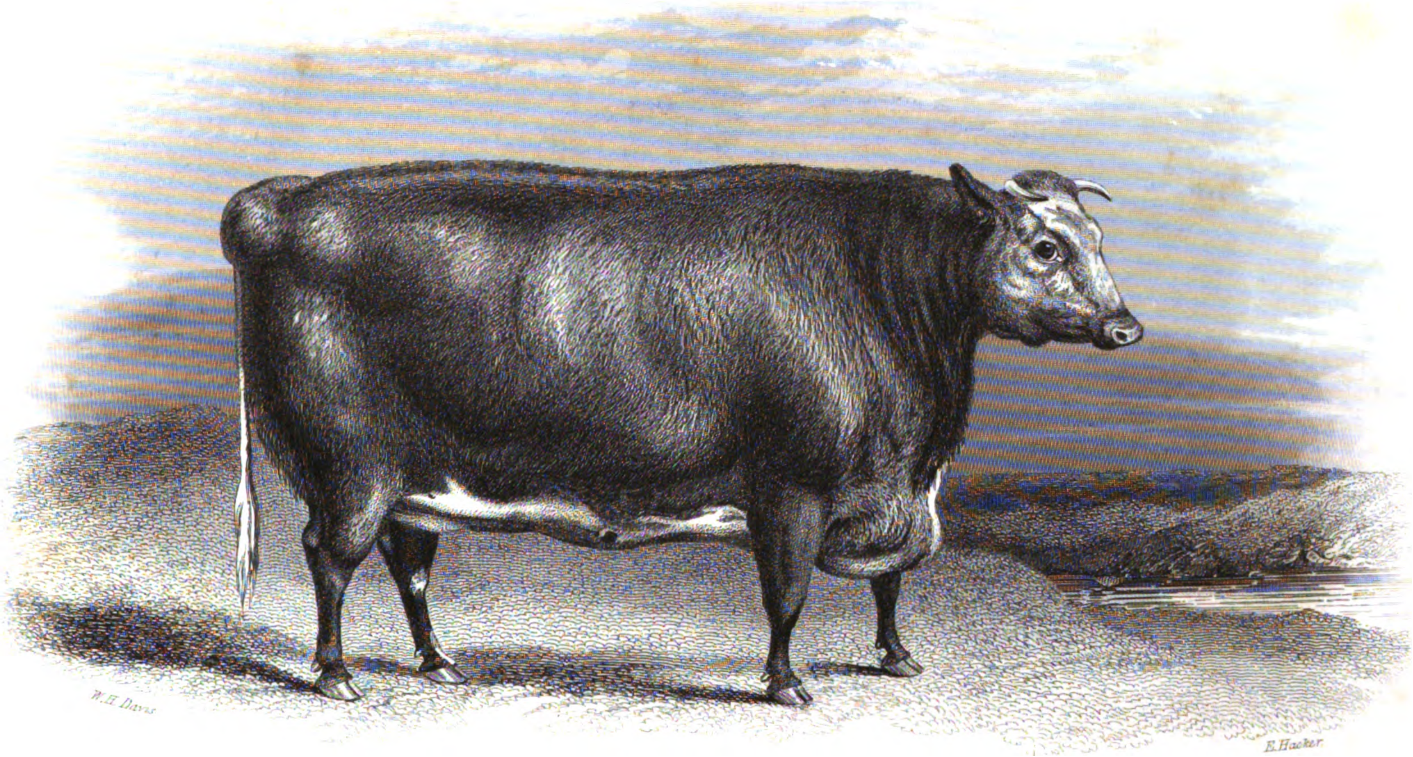

Victoria.

A Short Horn Cow the Property of Lieut. Colonel Towneley of Towneley Park Burnley, for which the First Prize of £20 was awarded at the Salisbury Meeting of the R. A. S. of England, July 1857.

London Published by Rogerson & Tuxford 246 Strand 1857

Engraved by J. B. Hunt, from a Photograph by Sharpe & Melville

Yours faithfully
Samuel Jonas

London Published by [illegible] Strand 1858

THE FARMER'S MAGAZINE.

MAY, 1858.

PLATE I.

PORTRAIT OF MR. SAMUEL JONAS.

PLATE II.

VICTORIA; A SHORT-HORN COW.

MR. SAMUEL JONAS.

There are few better representatives of his order than Mr. Sam. Jonas, of Ickleton. A shrewd judge and a spirited man of business, with every ability to carry out his intentions, he brings the character of the British farmer quite up to the standard of our own times. With something of the old school in his bearing and appearance, there is no one more alive to the advancement and improvement the art of agriculture must achieve. It is, indeed, from the experience of such men that we gather the only reliable test of the progress we are making. Theorists may write, and amateurs may talk, but it is the practical man who works. He flourishes or falls with the pursuit; and makes it his first duty to see what he can adopt and what he shall avoid. The farmer shuts himself up no longer in his own home and to his own prejudices. On the contrary, you find him all the world over; a farmer still, learning and sifting out all he can for the advantage of his profession.

"Sam Jones," as he is familiarly termed, is one of these—known all the world over. You see him at all our great meetings, bustling about either as one in authority, or in some other way quite as much interested in what is going on. It is not for himself alone either that he is speaking or working. On many an occasion ere this he has been one of the best champions of his class. There is moreover an independence of action and earnestness of purpose in what he does that is always sure to tell. Whether it be at a local meeting in his own county, or on a grand field-day in Hanover-square, there is no farmer speaks up for his fellows with more effect than Mr. Jonas. He occupies no ambiguous position, but is thoroughly identified with those he professes to feel for. And so when he says, the farmers "must have this," or "they wont have that," the Council know it is no idle boast or vain prayer they are now hearing of.

Mr. Jonas—like his relative Mr. Jonas Webb—is a native of Suffolk. He was born at Great Thurlow, in that county, on the 27th of September, 1802, so that he is now in the fifty-sixth year of his age. It is, however, with the county of Cambridge that, until very recently, he has been more identified, having farmed for a number of years at Ickleton. His doings even as a public man are all more or less associated with this district. He wrote, for instance, the Prize Essay on the farming of Cambridgeshire, for the "Journal of the Royal Agricultural Society"—the farming of his own county, as it was then called. This paper was an especial favourite with the late Mr. Pusey, the then Editor of the Journal, and often cited by him as an example of what such an essay should be.

More in connection—at least by its boundaries—with his present residence, Mr. Jonas was instrumental in forming the Saffron Walden Agricultural Society, of which it is almost needless to add he is a zealous supporter. His sideboard gives evidence with what success as an exhibitor.

Of the great national Society of the kingdom he has been almost from the first a prominent member. His name has been on the Council for no less than eighteen years, while he has been actively employed as a member of the sub, or really working committees. His services have not even ended here, as he has officiated as steward of the cattle-yard at five of the great annual meetings. His knowledge of his subject, unwearied activity, and business-like tact have more than usually well qualified him for such an appointment.

Some years since he was equally distinguished as a leading man at the meetings of the Protection Society—a cause of which he was a most energetic and determined supporter. He wrote a good deal at the time, in maintenance of the principles he so warmly advocated and so conscientiously believed in. Although he fought a losing battle, he retains the friendship of many good men he here first became acquainted with. They saw and appreciated how thoroughly he was in earnest.

Mr. Jonas has been for some years a Director of the Royal Farmers' Insurance Institution; and is, in fact, ever ready to take his part in promoting the interests and watching over the welfare of his brother farmers.

Mr. Jonas has left Ickleton, and is now occupying about three thousand acres of land at Chrishall Grange, near Saffron Walden, in Essex. The largest portion of this extensive holding, when first engaged on by him, was in as exhausted and as foul a state as it was possible to imagine. It was truly uphill work. His proverbial energy and determination have, however, brought it round; and we believe we are justified in saying that, for the spirited manner in which he cultivates his land, and the large sums he expends in food for stock and artificial manures, Mr. Jonas ranks worthily with Mr. Hudson of Castle Acre, and other such eminent English farmers.

We usher him accordingly into their company; where his friend Mr. Webb first "sat" at our request, now some years since.

PLATE II.

VICTORIA, A SHORT-HORN COW;

THE PROPERTY OF LIEUT.-COLONEL TOWNELEY, OF TOWNELEY PARK, BURNLEY.

VICTORIA, a red roan cow, bred by Colonel Towneley, calved October 30, 1853; got by Valiant (10989), dam (Jenny Lind) by Bem (8831), g. d. (Ruby) by Selim (8545), gr. g. d. (Lady) by the Earl of Aylsford (6156), gr. gr. g. d. (Lily) by Sir Robert (5178), gr. gr. gr. g. d. bought at the Earl of Aylsford's sale.

Victoria ranks amongst the most famous of prize animals. She has already taken no less than fifteen first prizes, at meetings of the Royal Agricultural Society of England, of the Yorkshire Society, the Midland Counties Society, the Smithfield Club, and others of more local repute. At the Chelmsford meeting of the Royal Society, in 1856, she was awarded the first prize as the best heifer in-calf, which she produced in the September following. At the Salisbury show, in 1857, she was awarded the first prize as the best cow. In the December of the same year she took the first prize as the best of her breed, and the GOLD MEDAL as the best of all the cows at the Birmingham Fat Cattle Exhibition. The next week she was again declared the first prize and GOLD MEDAL cow at the Smithfield Club. Never before this has any one animal been so highly honoured.

Victoria is really a splendid cow—of most magnificent proportions, perfect symmetry, and admirable quality. Her head is neat, breadth great, and her chine, chest, and fore-quarter wonderful—as, indeed, is she good all through. She had fed, moreover, most evenly, and was an extraordinary specimen of what a fat beast should be. Victoria, however, was not destined for the butcher, but returned after her last triumph at the Smithfield Club to Towneley Park. She was even said to be in calf when exhibited—a declaration that, it will be remembered, caused some talk at the time. Victoria's praises should be sung over the "Herd Book," and not in Mr. Jeffries' window.

THE WANDLE VALLEY.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The farming of the valley of the Wandle river partakes rather too much of the character of the other suburban districts. The high prices paid in the metropolis for certain roots and household vegetables, and the ready access to almost inexhaustible supplies of organic manure, enable most of the holders of the land near London to cultivate their ground in defiance of all rotations, regardless of almost any other object than that of the highest-priced produce. The farming of the Wandle valley is not an exception to this rule. From its commencement at Croydon till it terminates at Wandsworth, the banks of this bright chalk stream are hardly ever more than ten miles from Westminster Bridge; the influence of London upon the lands around it is therefore evident at every footstep we advance along all the rich vale through which it flows towards the Thames.

Still there are some things to be noted even here, worthy of the attention of the farmers of other districts of our island. The very geological situation of the valley is worthy of notice. The Wandle, in fact, traverses pretty closely, for a considerable portion of its course, the line which marks the division of the London and the plastic clays, from the great southern chalk formation. As the traveller descends the valley from Croydon, he will find the clay hills of the London basin sloping down to the northern bank of the river, and the chalk hills bounding his view, and forming the soils of the south side of the stream. From the base of these considerable chalk hills issue forth the copious bright springs which form the Wandle river; and on their northern slopes rest the calcareous loam soils, known in Surrey as "the marme lands"—soils long since correctly described by Stevenson as deep hazel loams resting on the chalk, and varying in depth with the elevation: very deep at the base of the hills, and thinning off to three or four inches in ascending to the Downs. When deep, there is no drawback to their fertility. When shallow, pale, and inclining to clay they are considered to form backward soils in the spring. They are described by Mr. Trimmer as forming a narrow band extending on the north-side of the chalk hills from Croydon to Guildford (*Jour. Roy. Ag. Soc.*, vol. xii., p. 488).

If the farmer, in his way, during the month of May, from London to "The Derby," alights for an hour or two at the Carshalton station, he will find himself on this marme soil. He will first see around him extensive fields of lavender and other scented oil-producing plants; and leaving them, he will enter upon the marme farms, held by considerable and enterprising holders. He will find here the ordinary powerful Kentish turnwrest plough chiefly employed; and if he has not been used to see it in operation, he will hardly fail to note how much better it does its work than its first appearance would lead the stranger to anticipate.

It was on these lands that, in the past month of April, I found the powerful steam-ploughs of Mr. Fowler. They were at work on a sainfoin field of the hazel loam to which I have before alluded. Around these were assembled a group of intelligent farmers, with Garrett of Leiston, and other zealous and scientific implement makers. Here I had the pleasure of again noting the excellent work which these steam-ploughs accomplished, the evenness and depth of the furrows, and the uninterrupted steadiness with which the machinery accomplished its allotted task.

Few spots could have been better chosen for such trials than this field at Woodcote; the soil being of an even texture; the field level and extensive, and not altogether devoid of historical recollections, which might serve to cheer on the skilful modern implement maker in his difficult task; since, only a few fields off, in the same hamlet of Woodcote, is found the site of the old British, and afterwards Roman Noviomagus, where it is pretty certain rude old British, and Roman ploughs once merely roughly-stirred the surface of the ill-cultivated land, and where the ploughman could not venture forth to his miserably-executed task without an armed attendant to protect him and his team from the robber. Strange advances these, from the old wooden plough then employed, made by the ploughman's own hands, and dragged slowly through the soil by half-a-dozen ill-fed horses or oxen, to the ploughs of the turnwrest, and of Ransome, and Howard, and Fowler!

Of the steam plough, I am well-disposed to speak hopefully. Much has already been done with it: practice and experience will in time assuredly do far more to render it practically available; and this remark may apply not only to the plough dragged through the soil by portable engines, but to the too-much-neglected digging machines, which have been hitherto only partially successful. The existing general feeling of the farmers of Surrey, with regard to the steam plough, is much the same as those which have been pretty well described by Mr. C. W. Hoskyns, in his report upon the implements of the Salisbury Meeting, where he observes (*Jour. Roy. Ag. Soc.*, vol. xviii., p. 424): "It is remarkable, and may be accounted for by those who can best explain the alternations of public feeling and opinion, that at Chelmsford, the year before, the one expression heard on every side was, in various modes of exclamation, to the effect that 'at last the problem of steam-culture was solved!' while at Salisbury, where the preparations for this new class of trials were on a scale far larger, and twice the number of competitors were actually on the field (several more having been entered), the general expression was quite the other way. Not that the interest shown, or the concourse of spectators, was less; but a feeling the opposite of anything like sanguine expectation, or the prospect of realized results, seemed to have gained ground during the lapse of the twelvemonth. Whether it was that there had been time to reflect that, after all, there was nothing really new in ploughing by steam, except perhaps in the subordinate ingenuity of improved details in connecting the implement with the engine, or in turning at the headlands, or whether simply because the novelty of the thing as matter of competitive trial had lost its first freshness, the eager expressions of expectation heard before had subsided into a tone and attitude of mere criticizing interest, somewhat difficult indeed either to accommodate, or, in the language of the police, to 'keep back,' so that the ploughs, and workmen attending the machinery, might have room to act, but far from exhibiting the ready and impulsive conviction of a thing accomplished, that had been noticed the year before.

"Of the actual trials themselves, at Salisbury, to say much is impossible. Such a soil, on such a situation, hardened to such a condition not only by its own flinty nature, but by the long-continued influence of one of the most extraordinary seasons that has ever been known, were enough to render any trial practically abortive. But no one who saw the work performed, even under these adverse circumstances, by Mr. Fowler's plough, could doubt that, in his case at least (not to the least disparagement of the other competitors), steam-*ploughing*, as such, had attained a degree of excellence comparable in point of execution even with the best horse-work. As to the relative economy, there seems little reason to doubt that the calculations arrived at by Mr. Amos and others the year before, at the adjourned trial at Boxted Lodge, were sufficiently near the truth to leave a very considerable difference in favour of horse-work. And if this be true as a comparison, merely taking acre for acre, or hour for hour, every one who knows the supreme value of *time* in the autumn months on clay soils, and the difference, in capacity of *day-work*, between a horse and a steam-engine, must be aware that a new multiplier at least of 2, if not more, may be placed to the credit of the steam-engine, regarded as an available power or auxiliary when work is pressing, and when, according to a well-known poetical authority, the best, or rather only method to lengthen the shortening days, is to 'steal a few hours from night.'"

On the right-hand side of the road leading through Woodcote to Banstead, the traveller will pass "The Oaks," once the beautiful hunting seat of the Derby family, the early and powerful supporters of the races at Epsom, whose former powerful influence there is still known throughout the land in the "Derby" and the "Oaks." About a quarter of a mile beyond this seat commences the yet unenclosed portion of Banstead Downs, which a few generations only since extended from Epsom Downs to Croydon; and to the pedestrian or the equestrian traveller on his road to Epsom, I commend the open down to the right of the road as one of the most picturesque routes he can select. He will see here the farming of the most thin-skinned chalk soils, intermixed here and there with fields of stiffer soil, and of the diluvian alluded to by Mr. H. Evershed in his prize report on the Farming of Surrey (*Jour. Roy. Ag. Soc.*, vol. xiv., p. 395); and, during nearly the whole distance between "The Oaks" and Epsom Downs, the explorer will traverse an elevated ridge commanding the finest views of the valleys of the Wandle and the Thames, backed by the distant hills of Middlesex and Buckinghamshire.

As is remarked by Mr. Evershed, in many instances the natural herbage which clothes the sides of the chalk ridge, producing alike an imposing prospect and very useful sheep pasturage, has been broken up and brought under tillage; but the change has seldom produced satisfactory results, the unlevel position of the ground opposing a natural barrier to its cultivation, while the scantiness of the produce forms a very insufficient return for the necessary outlay. Under these circumstances the Downs of Surrey will probably long remain one of the most prominent features of a very beautiful locality. The size of the farms in this district varies from 200 to 600 acres, the average being about 300—the rental averaging about one pound per acre. The course of cropping as we recede from London is commonly the four or five-shift, viz.: 1. Turnips; 2. Barley; 3. Seeds; 4. Wheat, or 5. Oats. Sainfoin is extensively grown on the soils having a subsoil of chalk at a moderate distance. The irrigation system is not very extensively practised in the valley of the Wandle, although its waters (which bubble out of the base of the chalk in so many directions) are well adapted for the purpose. It is water containing the same foreign substances as those which irrigate the noble meads of the valleys of the Itchen, the Trent, the Wiltshire Avon, and the Kennett. The water of the Wandle, when examined by Professor Way, was found to contain in an imperial gallon—

Organic matter	1.74
Silica	0.45
Carbonate of lime	16.00
Carbonate of magnesia	0.47
Common salt	1.38
Sulphate of soda	0.98
Sulphate of potash	0.33
Total foreign substances	21.35

In this water, therefore—and the irrigators of other districts will do well to ponder over the fact—is to be found hardly any other substance of a fertilizing nature for the grasses than carbonate of lime. This salt is here held in solution chiefly by the presence in the water of a considerable proportion of carbonic acid gas. This is parted with by the water when heated to boiling, and then nearly 12 grains per gallon out of 16 of its carbonate of lime is deposited. A similar effect is produced by exposing the water in an open vessel to the action of the sun's rays, and it is probable these phenomena may in some degree account for the excellence of the chalk formations' waters for the purposes of grass irrigation.

Many of these things attracted the attention of Arthur Young, who often visited this valley. It was at the farm of Waddon Court, more than half a century since, that he was frequently the guest of the eccentric John Parker, who there farmed more than 2,000 acres. It was here that Young used to meet John Marshall, Grose (the antiquarian), the Boscawens, and a few other enlightened enquirers after truth. The modern agriculturist who treads over the same ground will proceed with far greater advantages than those who, towards the close of the last century, were thus accustomed to assemble together. Such an explorer will have that advanced science to aid him of which poor Arthur Young was wont to so feelingly lament his deficiency. The visitor in our day will moreover, be cheered on by observing, many things accomplished here of which the Surrey farmers of the last century were unacquainted. Such an enquirer will feel assured, after viewing even in the Wandle valley many other good efforts besides the steam plough, that there are as yet no symptoms of agriculture having attained its culminating point.

WEEDS AND WEEDING.

The season is at hand when every good farmer is keeping a close over-sight upon the various weeds which infest the crops of his farm, and the land he is fallowing. It is a very important season to a cleanly farmer, and he is often sorely perplexed as to the best means to adopt for eradicating these pests to good cultivation. His first aim will be to clean his fallows; and the greatest pests he finds there are root-weeds, *i. e.*, twitch, docks, foal-foot, buttercups, cornbine, thistles, goose-grass or pignut, toadpipe, horse-mint, &c., &c., &c.; many of these roots are very tenacious of life, and will require his utmost attention and care to overcome their hardy habits and to destroy them. Their varieties are very numerous. The varieties in twitch alone have been stated to reach seventy-three distinct specimens; and the sorts vary in the size and strength of their roots, from the thickness of a tobacco-pipe to the fine thread-like sort, a short and almost interminable kind. The larger sorts may with tolerable facility be worked up to the surface, in fallowing, by a requisite number of scarifyings and harrowings, from whence they can easily be got off and burnt; but the finer varieties are with very great difficulty managed. The more you plough, scuffle, and harrow, the more sets you make; and as every knot is a set, they soon strike in fine mould, and are so minute as to be almost undiscernible; and unless the weather is dry and sunny—indeed, so scorching hot as to injure vegetation—this kind can scarcely be got rid of. To effect this most desirable end, in fallowing the soils that produce this sort, it is necessary to keep it constantly stirred either by harrow or scarifier; the latter to be preferred. However, I am not speaking of the best mode of fallowing at this time, but of the eradication of weeds. The great end is to keep them on the surface in fallow time, so that the sun's scorching heat may dry them up. Docks, foal-foot, buttercups, thistles, pig-nut, horse-mint, toadpipe or mare's-tail, as also cornbine and hog-grass, have each hardy roots, and require the same kind of management to effect their destruction. The safest course, however, is to pick off most of these larger roots for burning; but the twitch may be better got off by raking, or by the use of the chain harrow. This is a comparatively new application of this implement; but in a dry season, and twitch being abundant, it is probably the best appliance for clearing the land we yet have had introduced. These harrows act in a double capacity—by pulverizing the surface, and at the same time rolling the twitch up into irregular collections of various sizes, and quite as clean as by the hand-rake. For rolling off the finer sorts of

twitch it is a very effective implement, and worthy the adoption of light-land farmers where such twitch abounds. Phillips' poppy extirpator may also be advantageously used in lightening up this sort of twitch, and freeing it from adhering soil. *Howards* and *Ransomes* have fitted these extirpating teeth to their horse-rakes, with every prospect of great usefulness in working, and of economy to the purchaser. A combined implement of this kind cannot fail to be advantageous, as it is brought into such general requisition upon the farm at different seasons. In the spring it is a poppy extirpator, in the summer a twitch and hay-rake, and in the autumn a stubble-rake.

I am well aware that good clay-land farmers are apt to scoff at twitch growers, and pronounce them to be bad farmers; be this as it may, it is still the great bane of every light-land farmer, and of not a few heavy-lands men. Much has been written upon the best modes of extirpating it, but to no great purpose; and so long as farmers will crop heavily (and why should they not ?) they must expect a continuation of this pest. What steam cultivation may effect I cannot say, but with our present appliances I am without hope. The great thing at present is to keep it in subjection, so as not to allow it to injure any growing crop. The introduction of steam culture will enable us to work our lands when our horses are in full requisition in harvest and other work, which is one great means to this desirable end; and much good will unquestionably arise, leading to a further extension of our rotations in cropping: but the pest still remains. I will, therefore, offer a few observations or suggestions as to the most effective mode of subduing or suppressing it. The first attack should commence immediately after the corn is cut. Wherever there is a plant or bed of twitch, it should be broken up either by fork or other more powerful implement. The deeper the better, so as to reach the bottom of the roots: the further spreading will thus be prevented. As soon as opportunity serves, and the season is suitable, it should be worked to the surface and be picked off. Another excellent mode is to have all the green crops—the fallow crops—looked over in the autumn, and have every plant of twitch forked up and carried off: this is taking the young plant before it has time to gain much strength and spread its roots, "nipping it in the bud." The broad-clover crops ought also to be looked over, and every stray plant should be extracted. Every hedge-row should be cleansed during the winter, so that neither roots nor ripened seeds should be permitted to propagate their stock; finally, never let a plant of twitch stand unmolested on any part of the farm where it can be got at without damaging the crop.

As preventives, never sow any grass seeds containing the seeds of twitch: this is one of the worst and most pernicious things done by a farmer in the whole course of his business, and is the great nursery of twitch. A thorough determination to avoid this at all hazards would ultimately cause the growers of rye-grass seeds to be more cautious. Cheap grass seeds are notorious intermixtures, and certain propagators of twitch. Meadow-grass seeds abound in twitch seeds, &c. Once in every summer at least, cleanse out or "*rode*" every ditch, and do not permit the ditch-side grasses to ripen their seeds, so that birds and stormy winds may carry and deposit them over the lands adjoining. Hedgerows should also be looked over in July or August, and the detrimental grasses growing here should be cut down. Constant laborious attention will be ever needed to rid the farm of this most obnoxious enemy, and no opportunity should be lost whenever the land is clear, and in a state to be worked. It is by long courses of cropping, by delayed cultivation, or in resting the soil, that much increase takes place. Let every farmer pay due attention to these minor points, and then he will have the satisfaction to cultivate a cleanly farm.

THE GROWTH OF BARLEY BY DIFFERENT MANURES CONTINUOUSLY ON THE SAME LAND, AND THE POSITION OF THE CROP IN ROTATION.

By J. B. Lawes, F.R.S., F.C.S., and Dr. J. H. Gilbert, F.C.S.

The original paper under this title, of which the following is an abstract, occupies nearly eighty pages of the last number of the *Journal* of the Royal Agricultural Society of England (vol. xviii., part ii. pp. 454—531). The results of extensive series of experiments are there given, in much detail, in the tabular form. It is proposed to give here only an outline of the plan of the experiments, and an abstract of the conclusions arrived at, with but little numerical detail. A main object of the inquiry was to ascertain the characteristic manuring required for full crops of barley as grown in our rotations. The results of three separate sets of experiments are brought to bear on the question; and others, of an earlier date (1845), had given results consistent with those now more fully considered. In the first set of the newer series the crop was grown, after two previous corn-crops, for six successive years on the same land with different descriptions of manure, the same being applied to the same plot each year. One or two plots were always without manure, one with farm-yard manure, some with purely mineral manures, some with ammoniacal salts alone, some with nitrate of soda alone, some with rape-cake alone, and some with mixtures of both the mineral and nitrogenous manures; in all, making about twenty experiments each year. In a second field, barley was grown for three years in succession, without manure, after ten successive crops of turnips, which on some of the plots had had no manure, on others mineral manures alone, on others mineral and nitrogenous manures, and so on. In a third field, barley was grown experimentally in the ordinary rotation of turnips, barley, clover (or other leguminous crop), and wheat. In the rotation experiments one plot was entirely unmanured throughout each course; a second had superphosphate of lime only, and this for the root crop alone; and a third was well manured with mineral, nitrogenous, and carbonaceous manure, for the roots commencing each course. The produce of the barley of three successive courses of each of these differently manured rotations has been recorded.

The experiments on the successive growth of barley on the same land with different manures come first under consideration. And the point relating to them to be first noticed is the very varyin result obtained with one and the same manure, in the six different seasons (1852—7) in which the trials were made. On this point it is remarked—

"From the pervading influence of *season*, by which the produce may be double as much one year as another, even with one and the same set of conditions supplied by the farmer, and by which, when unfavourable, the crops most highly manured suffer most, it results that the amount of produce obtained for a given outlay in manure may be only half as much in some seasons as in others." It resulted, too, that the higher the condition of manuring, if beyond a somewhat even narrow limit, the less was the proportional return of produce for a given quantity of manure.

Referring to the effects of the different *manures*, notes taken in the field showed, that the crops grown on the unmanured, and on the only mineral-manured plots, as a rule stood up till the time of cutting. Those having nitrogen in manure equal to about 50lbs of ammonia per acre per annum (supplied by 200lbs. of salts of ammonia,* or 275lbs. nitrate of soda†), were generally, more or less laid; as also were those grown by farmyard manure. Those having double this amount of nitrogen in the manure, or more (supplied by 400lbs. ammoniacal salts, 550lbs. of nitrate of soda, or in 2,000lbs. rape-cake), were invariably laid, and in most years very much and injuriously so. The produce with this latter amount of manure was in fact far too heavy to bear any moderate amount of rain about or after the time of heading. Of the mineral manures used, the "*mixed alkalies*," which consisted of a mixture of the sulphates of potash, soda, and magnesia, whether alone or in admixture with nitrogenous manures, invariably tended to retard the ripening of the crop. Superphosphate of lime, on the other hand, always tended to early ripening. The superphosphate of lime also always gave a notable increase of crop, whether it was used alone, in admixture with other mineral manures, or with nitrogenous manures. The nitrogenous manures, however, increased the produce in a far greater degree than any of the purely mineral combinations.

In the following table is given a summary of the numerical results obtained, showing the average annual produce taken over the six years of the experiments, by each characteristic description of manure employed:

ABSTRACT OF RESULTS OF EXPERIMENTS ON THE GROWTH OF BARLEY BY DIFFERENT MANURES, DURING SIX CONSECUTIVE YEARS ON THE SAME LAND, 1852, '3, '4, '5, '6, AND '7.—HOOS FIELD, ROTHAMSTED, HERTS.

Nos.	MANURES—QUANTITIES PER ACRE PER ANNUM.	AVERAGE ANNUAL PRODUCE PER ACRE. Dressed Corn. Quantity.		AVERAGE ANNUAL PRODUCE PER ACRE. Dressed Corn. Weight per bushel.	Total Corn.	Straw and Chaff.	Total Produce (Corn and Straw).
		Bush.	pecks.	lbs. & tenths.	lbs.	lbs.	lbs.
1	Farm-yarm manure, 14 tons	43	0¾	52·0	2,407	2,790	5,197
2	No manure	28	0	51·9	1,585	1,760	3,345
3	Mineral manures, only (mean of 3 plots)	31	2¾	51·9	1,763	1,885	3,648
4	275 lbs. nitrate of soda, alone (containing nitrogen = about 50 lbs. ammonia)	42	0¼	51·9	2,364	2,862	5,226
5	100 lbs. each sulphate and muriate ammonia, alone (containing nitrogen = about 50 lbs. ammonia)	38	2½	51·5	2,191	2,538	4,729
6	100 lbs. each sulphate and muriate ammonia (containing nitrogen = about 50 lbs. ammonia), and mineral manures in addition (mean of 3 plots)	43	3¼	51·8	2,471	3,075	5,546
7	550 lbs. nitrate of soda, alone (containing nitrogen = about 100 lbs. ammonia)	47	3¾	50·9	2,666	3,532	6,198
8	200 lbs. each sulphate and muriate ammonia, alone (containing nitrogen = about 100 lbs. ammonia)	46	0	50·7	2,603	3,191	5,794
9	200 lbs. each sulphate and muriate ammonia (containing nitrogen = about 100 lbs. ammonia), and mineral manures in addition (mean of 3 plots)	47	3	50·6	2,672	3,783	6,405
10	2000 lbs. rape-cake, alone (containing nitrogen = more than 100 lbs. ammonia)	48	0¾	50·9	2,664	3,548	6,212
11	2000 lbs. rape-cake (containing nitrogen = more than 100 lbs. ammonia), and mineral manures in addition (mean of 3 plots)	46	3	51·0	2,613	3,553	6,166

From a review of the whole of the results relating to the action of the special manures upon the barley crop, taking the average of six successive years of growth by each, on land in an agricultural sense somewhat exhausted for corn-growth, the following conclusions are arrived at :

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* An equal mixture of the sulphate and muriate of ammonia of commerce.

† The commercial nitrate of soda.

"That exclusively mineral manures, and especially those containing phosphoric acid, annually increased the produce of barley; even doing so in the first year of their application on land in the condition described."

"That with barley grown continuously on the same land (as was the case with wheat), nitrogenous manures had a much more striking effect than mineral manures."

"That by the annual supply of nitrogenous manures alone (nitrate of soda or ammoniacal salts), larger successive crops both of corn and straw were obtained, than by the annual use of 14 tons of farmyard manure, with all its minerals, and certainly more nitrogen than either the nitrate or ammoniacal salts employed by its side."

"That within certain limits, even on this comparatively exhausted soil (and it would probably be more nearly so on soils in ordinary condition for the crop), nitrate of soda, ammoniacal salts, and rape-cake, all increase the produce of barley, approximately in proportion to the amounts of nitrogen they respectively supplied. Their comparative effects will, however, vary somewhat according to season, the nitrate being generally more rapid in its action."

"That to obtain a maximum amount of increase in proportion to the nitrogen given in manure, the barley crop will, on the average of seasons, bear a considerably less acreage amount of it than is required by the wheat crop under similar circumstances."

"That the effect of a given amount of nitrogen, if not excessive, will be considerably increased by the addition of certain mineral manures, especially those containing phosphates. The action of the mineral manures is very much increased under such circumstances; that is, their application gives very much more increase, when there is present a liberal supply of *available nitrogen within the soil*, than when there is not."

"In other words, a soil brought by previous cropping into a condition to require manure of some kind before it will grow a full crop of corn, when afterwards cropped year after year with barley, only yields full crops when a liberal amount of nitrogen is supplied to the soil. Mineral manures, especially phosphates, considerably increase the action of the nitrogen so supplied; but the effect of such mineral manures on the increase of crop will be extremely limited, without there be a liberal amount of *available nitrogen within the soil itself*."

The next set of experiments to be noticed, is that in which barley was taken successively from the same land in the seasons of 1853, '4, and '5, after ten successive crops of turnips, which had been grown experimentally, by different manures.

On one plot, the last seven of the ten preceding crops of turnips had been grown without any manure whatever; and this unmanured produce, leaf and bulb together, averaged little more than two tons per acre per annum. The second plot had received for the last eight of the ten crops of turnips liberal supplies of mineral constituents, mostly in much larger quantities than they were taken off in the root crops. Plot 3 had the same mineral manures for the turnips as plot 2, and, in addition, during the six middle years of the ten, about 44 lbs. of nitrogen per acre per annum in the form of ammoniacal salts. On the 4th plot there had been the same mineral manures as on plots 2 and 3, and an average annual addition, during six of the years of turnips, of about 95 lbs. of nitrogen per acre, in the form of rape-cake. The turnips on the 5th plot had received the same mineral manures as on plots 2, 3, and 4, and in addition, during six of the years, both the ammoniacal salts as on plot 3, and the rape-cake as on plot 4, which together gave an average annual supply of about 140 lbs. of nitrogen per acre.

The mineral-manured plot gave much larger crops of turnips than the unmanured one; and the addition of nitrogen, and other organic constituents of manure, as on plots 3, 4, and 5, always afforded a further increment of increase. But in neither of the three cases was the nitrogen recovered in the increased produce of the turnips equal to that which was supplied in the manure. It might be expected therefore that where nitrogen was supplied for the turnips—unless it were evaporated or drained in some form from the soil, distributed too widely throughout it, fixed in it in an unavailable condition of combination, or in some way dissipated during the growth of the plant—that there would be some remaining available for the three succeeding crops of barley. The discussion of the results of the three years' growth of barley, after the ten differently manured turnip crops, is prefaced as follows:—

"If the characteristic influence of a *rotation of crops*, upon the increased growth of the cereals, be at all materially due to the elaboration in the soil, during the growth of the other crops, of the necessary mineral supplies for the white crop, it might surely be expected that here, aften ten meagre, unmanured crops of turnips, appropriating no amount of silicates, we should have, if ever it were possible, a large produce of barley, depending, with these rich stores of prepared mineral food in the soil, upon atmospheric sources for its nitrogen? If not after the many crops of *unmanured* turnips, surely after those provided with a very large excess of other mineral matters than silicates—the crop taking none of the latter out—we should have enough elaborated and conserved in the soil both of these and of all other mineral constituents, to yield the fullest crop of barley which it is possible to obtain by the conjoint influence of a very rich mineral condition of soil, and the normal season supplies of available nitrogen?"

But the result was that, comparing the produce of barley after the unmanured turnips with the unmanured produce during the same three years, in the field devoted to the continuous growth of the crop by different manures, the turnip land gave an average annual produce of not quite 19 bushels of corn, and the continuous barley field nearly 32 bushels. The amount of straw, too, was only about two-thirds as much after the ten crops of turnips as in the field whence so much more corn had been recently taken. In fact, a produce of scarcely 19 bushels per acre per annum of barley corn, and little more than half a ton of straw—together, equal to not a ton of dry substance of produce—will be admitted to be exceedingly small. The conclusion was, that the *condition* of the land, after ten successive crops of turnips had been removed, must have been, for barley growth, at the lowest possible point.

"That a liberal supply of mineral constituents distributed through the soil cannot restore this exhausted fertility is seen by the produce of barley after the mineral-manured turnips. After ten years of turnips, the last eight of which were grown by excessive supplies of mineral manures, we have an annual average of 54lbs., or 1 bushel of corn more, and 79lbs. of straw less, equal to 25lbs. *less total produce*, than after the unmanured turnips."

The question is then—"In what constituent, or constituents, had these unmanured and mineral-manured turnips exhausted the soil, in so far as the after production of barley was concerned, to a point even far below that arrived at in the other field by the previous growth of one crop of wheat, one crop of barley with sulphate of ammonia, and one crop unmanured—that is, three white-straw crops in succession without mineral manure?"

A comparison of the produce of barley on the plots where the turnips had been manured with nitrogenous as well as mineral manures, with that where they had received mineral manures alone, throws some light on this point. Thus, where ammoniacal salts as well as mineral manures had been supplied to the turnips, the succeeding barley gave an average annual increase of about 2 bushels, or 102lbs., of corn, and 94lbs. straw, over the produce where the mineral manures alone had been applied. Where, in the rapecake, a larger amount of nitrogen had been supplied to the turnips, there was an average annual increase in the barley crop of 5¾ bushels of dressed corn, or 333lbs. total corn, and 381lbs. of straw. Lastly, where during six out of the ten years of turnips their manure (in the form of both ammoniacal salts and rapecake) supplied a still larger amount of nitrogen, in addition to the mineral manures, the succeeding barley gave an average annual increase of nearly 5¼ bushels of dressed corn, or 315lbs. total corn, and 331lbs. of straw, over the produce where there had been mineral manures alone.

"We had then, with a residue in the soil of merely mineral manures, even a loss of produce of barley—due to a greater growth, and consequent greater exhaustion of other matters, by the turnip. We find, on the other hand, a perceptible gain in the barley wherever the turnips had received either ammoniacal salts or rapecake as well as the mineral manures. Even here, however, the produce, with this nitrogenous and full mineral residue in the soil, was not equal to the annual unmanured produce in the other field, where the barley was growing continuously."

"That the beneficial effect of the residue of the rapecake was not due to the mineral constituents it supplied, may be judged by the fact, that the residue of the direct mineral manures had not any such effect. It was undoubtedly a residue of *available nitrogen within the soil*, that gave the increase of produce of barley where the ammoniacal salts or rape-cake had been employed for the turnips. If this be admitted, we have in the facts at once a beautiful illustration of the degree of reliance upon nitrogen in the soil, of the turnip crop, and of the utter incapability of rich supplies of mineral constituents in the soil, to be of any avail in yielding agricultural quantities of barley, unless there be at the same time *within the soil* a liberal amount of *available nitrogen*."

If further proof be wanted that the necessary mineral constituents were in abundance, and available in this turnip-exhausted soil for very full crops of barley, provided only available nitrogen were also within the reach of the roots of the plants, it is to be found in the results of experiments, in which, in one of the three years of barley after turnips, one portion of the plot, where the residue of the turnip mineral-manures alone had been unavailing to increase the produce of barley, now received about 82lbs. of nitrogen in the form of ammoniacal salts, and another portion about the same amount of nitrogen in nitrate of soda. They were as follows:

"In 1854, those portions of the mineral-manured plots left without further manure gave 19½ bushels. But where now (in 1854), about 82lbs. of nitrogen per acre were added as ammoniacal salts,* we had, instead of 19½ bushels, 52½ bushels of barley; and where the same quantity of nitrogen was added as nitrate of soda,† 54¾ bushels. The increase in the produce of straw was in greater proportion still. By the addition of the ammoniacal salts, the straw was raised from 1,397lbs. per acre to 4,379lbs.; and by the nitrate of soda it was increased to 4,781lbs. The total produce (corn and straw together), was thus from 3 to 3½ times as great by the simple addition of ammoniacal salts or nitrate of soda." And it may be observed, in passing, that here, as has been noticed in other cases, the nitrate of soda was more active than a quantity of ammoniacal salts containing an assumed equal amount of nitrogen.

"It is very remarkable too, that although the produce after the mineral-manured turnips was little more than half as much as the unmanured produce in the field of continuous barley experiments, yet the addition of a given amount of nitrogen gave very nearly identical results in both fields. Thus, after the mineral-manured turnips, we had, with the ammonaical salts and nitrate of soda respectively, 7,377lbs. and 8,005lbs. of total produce (corn and straw together); and in the field of continuous barley experiments we had, with the same amount of nitrogen, given as ammoniacal salts (without minerals), 7,548lbs., and as nitrate of soda (second year without minerals), 7,400lbs. of total produce. Again, in the same field of continuous barley experiments, the mean result of direct mineral manures and ammoniacal salts together, was 8,320lbs.; and that of even more nitrogen given as rape-cake (itself supplying also mineral constituents, as well as carbonaceous organic matter), with, in three out of four cases, direct mineral manures also, was 8,150lbs."

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* 200lbs. sulphate and 200lbs. muriate of ammonia of commerce.

† 550lbs. commercial nitrate of soda.

"In the contrasts and coincidences afforded by the results in these two fields, we have the clearest evidence that it was in *available nitrogen* for the barley crop that the previously mineral-manured turnip soil had become deficient, as compared with the unmanured land in the field of continuous barley experiments. It is evident, moreover, that on the mineral-manured turnip plots there was an abundant provision of the requisite mineral constituents for an exceedingly full crop, within the reach of the barley plant, provided only *available nitrogen* were also within the reach of its roots. Lastly, with the widely differing condition of the land in the two fields without further nitrogenous manure, and the approximation to equal amounts of produce when with comparable other conditions, both are supplied with a full dressing of such manure, again we learn how marked is the influence of season on the productive effects of our most active manures."

With the further light upon the "*condition*" of soil required by the barley crop, which the examination of the produce obtained after ten years of turnips, and its comparison with that in the other field, affords, the results obtained in still another field, under circumstances differing widely from either of the other two, are next to be considered.

In 1848, three portions, of nearly an acre each, were set apart for separate experiments on the chemical statistics of *rotations of crops*. For all three of these portions of land, the rotation chosen was—turnips, barley, clover, wheat. As was to be expected, however, the clover, coming round after a lapse of only four years, failed; hence, in the second and third courses, half of each plot was sown with beans, and the other half fallowed, instead of the clover. None of the crops were manured, excepting the turnips.

The plot of rotation No. 1 remained entirely unmanured—even the turnips—course after course.

The turnips of rotation No. 2 were manured, each time they came round, with superphosphate of lime alone.

The turnips of the third plot (rotation No. 3) were manured, each course, with superphosphate of lime, the sulphates of potash, soda, and magnesia, 2,000lbs. rape-cake, and 100lbs. each sulphate and muriate of ammonia, per acre.

There were, therefore, three parallel rotations with the same crops; one of these had no manure whatever, course after course; the second had superphosphate of lime alone, once in four years; and the third, after the same interval, received a mixed manure, supplying liberally to the soil phosphates and other mineral constituents, and both nitrogen and carbonaceous organic substance.

In each of the three four-course rotations, barley has been taken three times—namely, in 1849, in 1853, and in 1857; and, as from half of each turnip-plot the entire produce, leaf and bulb, was carted-off, and on the other half the roots were eaten by sheep, and the leaves distributed over the land, the produce of the barley on each turnip-plot was so subdivided, as to show the comparative effects of the drawing-off and folding. The turnips on the continuously unmanured plot averaged only from 4 to 4½ tons per acre, per course, leaf and bulb together; the superphosphated turnips from 13 to 14 tons; and those by the full mixed manure, over 20 tons.

The result was, that the produce of barley obtained in *rotation*, even when the turnips were both unmanured and carted-off, was considerably greater than when, as in the field first described, the crop was grown annually in succession on the same land, without manure. This was even more strikingly the case in the third unmanured rotation-course than previously. And it will be remembered that the barley grown continuously in succession was, in its turn, considerably more than that after the series of unmanured turnip-crops as in the second field considered. Consistently with this last point, the produce of barley in *rotation* was considerably less after those *carted-off* turnips which were grown by superphosphate of lime, than after those grown without any manure whatever. This is explained by the fact that much larger crops of turnips were taken from the superphosphated than from the unmanured land. On the other hand, as was to be expected, the *fed superphosphated* turnips gave larger succeeding crops of barley than the *fed unmanured* ones.

On the unmanured rotation-land, the folding of the meagre crops of turnips did not increase the produce of barley. On both the superphosphated and the mixed-manured rotation-plots, the folding of the turnips did much increase the produce of barley. The difference in the amount of barley after the folding, compared with that after the carting off of the turnips, was greatest on the *superphosphated* plot; in which case the exhaustion of the land by the *removal* of the turnips was the greatest, and the manuring from the *folding* was not too high. In fact, on the highly manured rotation-plot, the land after the removal of the turnips was still left in good condition, and after the folding in too high a one for the barley to stand the vicissitudes of season—under which it was the more liable to injury when manured beyond a somewhat limited degree.

It will now be interesting, for a moment, to review as a whole, the various field experiments on the growth of barley.

"It has been found, that the amount of produce when grown after a succession of removed unmanured, or even highly mineral-manured turnip crops, was far below a moderate agricultural yield. It was seen that by the simple addition of nitrogenous manure to land in this condition, enormous crops were raised. When barley was grown without manure year after year, on land in a less artificially exhausted condition than that where ten successive turnip crops had been grown, the produce was considerably greater than after the succession of turnip crops. On this land mineral manures somewhat increased the produce. But, as on the turnip exhausted land, nitrogenous manures did so much more strikingly. In both fields, indeed, the amount of available nitrogen supplied to the soil ruled the amount of produce very much more strikingly than did the supply of the necessary mineral constituents of the crop. In growing barley in *rotation*, on land previously brought to that comparative state of exhaustion, in which, under ordinary cultivation with home manuring and ordinary cropping, the conclusion of a course will leave it, the unmanured produce of barley throughout three subsequent courses of an entirely unmanured rotation was considerably greater than that where barley was grown year after year; and it was still further in excess of that obtained after a series of unmanured turnip crops."

"Here then is a striking effect upon the produce of barley by growing it in a *rotation*—even unmanured—of turnips, barley, clover, wheat. When the turnips in such a rotation were grown by superphosphate of lime, and by it larger crops of the roots removed than without manure, the produce of barley was less than after the unmanured turnips. Here too, then, the produce of barley is diminished after unusual exhaustion by turnip-cropping. But either the consumption of the superphosphated turnips on the land, the residue of a mixed mineral and nitrogenous manure after turnips grown by it had been carted off, or the consumption of these turnips on the land, greatly increased the subsequent produce of barley above that of the turnip-exhausted rotation land. It could certainly not be the restoration of mineral matters, to which, in these cases the increased produce of barley was mainly due; for the increase was greater by the consumption on the land of the merely superphosphated turnips, than by the residue of far richer mineral (and organic) manure where the turnips grown by it had been removed, taking away but a small proportion of the supplied minerals; and it was greater still where these highly-manured turnips were fed on the land, and returned to it a considerable amount of nitrogen, in addition to the already relative excessive amount of minerals. It was seen too, in the other fields, that mineral manures were quite unavailing to give even moderate crops of barley, unless there were *available nitrogen within the soil*."

"It may be fairly concluded that a characteristic effect of alternating the other crops with the barley, has been to leave more available nitrogen from some source, within the reach of the roots of the latter, than when either this same crop was grown continuously in succession, or when a number of successive turnip-crops were previously removed from the land. Barley then, like wheat, requires characteristically what may be termed a nitrogenous *condition* of soil. It cannot, however, under ordinary circumstances, bear such large amounts of nitrogen supplied as wheat; though what it does require, from the habit of the plant, and its usual limited period of growth, should be more confined to the upper layers of soil. For these reasons, barley may often be taken with advantage after a previous white crop, by a spring dressing merely, of chiefly nitrogenous manure. In such cases the direct addition of mineral manures, especially those containing phosphates, will have a more striking effect than upon the *winter-sown wheat*. The effect of such mineral manures is not only to increase the general growth, but to bring the crop more rapidly to maturity. The more frequent alternative is, that barley is taken after a root-crop, in part or entirely fed on the land. The appropriateness of this course for barley rather than for wheat, besides the advantage arising from the season of the year at which the land is generally clear for the corn, rests mainly on the fact, that the manure by folding, with the subsequent light working of the land, is more confined to the superficial layers of soil, in which, comparatively, the roots of the barley play more freely.

"A disadvantage of growing barley after the folding of sheep on turnips is, that with high farming the land is apt to be thus left in too high a condition for the crop to succeed well in the average of seasons; whilst, on the heavier lands, there is frequently much injury done to the texture, rendering it difficult to get the fine tilth so essential to the favourable growth of barley.

"Of direct portable manures for barley, Peruvian guano, or salts of ammonia, or nitrate of soda—either of them with a small quantity of superphosphate of lime—are the best. Rape-cake is also a good manure for barley, but it is generally too high in relative price. These manures, as well as purely mineral manures, are most advantageously applied before, or at the time of sowing, so as to be somewhat distributed through the surface soil by the mechanical operations. As a mere top-dressing nitrate of soda is the best. Of the more exclusively nitrogenous manures—salts of ammonia and nitrate of soda—the nitrate acts somewhat more rapidly for a given amount of nitrogen supplied. The action of the purely nitrogenous manures is economised by admixture with a small quantity of superphosphate of lime, or other appropriate mineral manure. Other things being equal, the later the barley is sown, the less should be the proportion of nitrogen in the manure, and the greater that of mineral constituents; otherwise the crop is liable to be too luxuriant; and with a limited range of root in the soil, it will probably not find mineral constituents rapidly enough in the later stages of growth, for a favourable development and maturing of the seed."

Some additional remarks are here appropriate, on the observed more marked effects of direct mineral manures on the *barley* than on the *wheat* crop. A consideration of the distinctive habits and usual circumstances of growth in our rotations, of these two nevertheless much allied crops will be found to throw some light on the point alluded to.

The necessity of considering the various habits and conformation of the different crops of our rotations in relation to their resources of growth was prominently insisted upon in previous papers, in the *Journal of the Royal Agricultural Society*, more than ten years ago. Such considerations, the bearings of which are among the first lessons taught by the progress of field experiments, tend materially to modify the conclusions to which a more purely chemical view of the offices and province of the various constituents in a system of manuring would lead. In order to verify and define the more obvious conclusions of superficial observation on some of the points here in question, the summer of 1846 was mainly devoted to the examination of the comparative underground ranges of the various crops of our rotations. In reference to the results of the experiments then made, it may be mentioned, that the relatively great depth and extent to which several of the leguminous crops, and also wheat and oats, penetrated, were very remarkable. In defect of drawings of the specimens then traced out, rough sketches taken in the case of some recent experiments, in which, with another object in view, wheat and barley had been grown side by side, under somewhat artificial conditions, in pots, illustrated the strikingly different distribution of the roots of these two plants. The barley threw only a single fibrile to the bottom of the pot. The wheat, on the other hand, sent out such a mass of ramifications, that the whole of the surface of the dish in which its pot rested was covered with a thick net-work of roots; as also was the bottom, and, to a great extent, the sides of the inside of the pot itself. The contrast here manifested is, indeed, pretty characteristic of the two plants as grown in our fields.

Further on this point:—"When considering the results of field experiments on wheat, we have directed attention to the fact, that the success of the autumn-sown crop was greatly dependent upon the progress of the under-ground development during the early months of growth. It was held that this was very much favoured, other things being equal, by a liberal supply of available nitrogen within the soil, and that thus, the range of collection of the fibrous feeders of the plant was so extended as to render available, when needed in the after-stages of growth of the plant, the mineral constituents of a much larger area of the soil than otherwise would be the case. Very different are the usual conditions of the growth of barley. Instead of winter-growth, and a compressed soil, tending to increased depth and area of root-distribution, we sow our barley in the spring, work the staple shallow, and keep it as light and open as possible. Under these circumstances of short time, rapid growth, and comparatively limited depth and area of root-development, we find the direct supply of some of the rarer, but essential mineral constituents of our soils, much more efficient with the barley crop than with wheat.

"The mechanical conditions of soil, and the season of growth of the barley crop, are in many respects more like those required by the turnip; and they are calculated to favour the distribution of a large amount of fibrous root near the surface, rather than any considerable development in the lower layers. In our paper on 'Turnip Culture,'* it was shown how much this distribution of surface root-fibres was increased by the use of superphosphate of lime. The same is the case with barley. It is obvious, that with this multiplication and more thickly-distributed net-work of root-fibres, the greater must be the resources of the plant within its comparatively limited period and area of growth. Thus it is, that the increased supply of certain important constituents within a limited area, enables the plant to provide itself more freely and rapidly with others it may require." Again—

"Still referring to the action and province of mineral manures applied to our crops grown on cultivated land, it has been shown on former occasions that, in a soil brought to what may be termed a condition of *agricultural* exhaustion—that is, at the end of a rotation, when in the ordinary course of things it would receive manure of some kind—the autumn-sown wheat was not increased in produce by the *direct* application of mineral manures, until so many crops had been taken from the land as to exhaust it of mineral constituents more than would happen under nearly a century of ordinary rotation and home-manuring. It has now been shown, that a very similar soil, certainly not more exhausted in an agricultural sense, gave an increase in the produce of *barley*, even on the first year's application of mineral manures. Collateral experiments in the same field, as well as those in other fields of very different, yet to a certain extent known history of relative exhaustion or fertility, showed, however, that mineral manures were competent to yield, under these conditions of agricultural exhaustion, but a small amount of increase when compared with that obtained by nitrogenous manures. The evidence has also led to the conclusion, that the mineral manures, if at all, yielded increase in an extremely limited degree, unless there were available nitrogen accumulated by some means *within the soil;* in fact, that the increase of produce, other things being equal, was more in proportion to such available nitrogen within the soil, than to any other supplied condition. It has, however, recently been maintained in the Journal of the Royal Agricultural Society, that our characteristic nitrogenous manures cannot be said to be active in proportion to the nitrogen they contain."

In the paper referred to,* Baron Liebig states, that ammonia alone, or nitric acid alone, has never been used in agricultural experiments. His conclusion is, that the acids in combination with ammonia in ammoniacal salts, and the bases in combination with nitric acid in the nitrates, have had their share in the results obtained by the use of these salts. He also further quotes experimental evidence to show, that the value of manures cannot depend upon the amount of their nitrogen, but must depend upon the substances combined with the nitrogen.

In regard to the first mentioned statement, which was one of fact, it might be observed, that the results of experiments made at Rothamsted had been published, in which ammonia in combination with only *carbonic* acid had been employed. Mr. Pusey had also given the results of trials, in which nitric acid, soda, and potash, were each separately applied to grass. Of these results Mr. Pusey said: "In both trials the nitric acid acted decidedly. The alkalies, neither of them produced even a trace of effect on the colour or on the growth of the grass." And again, "The question being whether in saltpetre the alkalies or the acid contain the active principle, we have found upon a given soil the alkalies absolutely inoperative, while the acid has acted exactly like saltpetre itself and like ammonia."

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* Journal of the Royal Agricultural Society, vol. viii., 1847.

* Ibid, vol. xvii., part 1.

As to the general question here at issue, "it cannot for a moment be denied that the state of combination of the nitrogen in our nitrogenous manures, or their admixture with other substances, has some share of influence on the result. We have clearly shown that they have an influence, fluctuating according to season, exhaustion, amount employed, and other circumstances. It is, however, entirely inadmissible to attempt to draw any conclusions as to the influence of the state of combination of the nitrogen, or of the effect of substances supplied with it, from the comparison of the results of experiments in which unequal quantities of nitrogen are employed to a given area, or which were made indiscriminately in the same or in different seasons. Every one, at all conversant with field experiments, will have been early impressed with the very varying proportional effect from one and the same manure, if used in different quantities in the same season, in even equal quantities in different seasons, and above all, in unequal quantities in different seasons. But Baron Liebig founds his arguments upon the influence of the varying chemical combination of nitrogen, and upon the comparative effects of ammoniacal salts used *alone*, or in admixture with other constituents, upon experiments with nitrogen in these different states, made indiscriminately with different quantities of nitrogen to a given area, and in different seasons."

M. Kuhlmann indeed, upon whose results Baron Liebig founds his arguments, called particular attention to the influence of the various seasons in which his experiments were made. The following statement must further show, that the experiments cited were quite incomparable on the point in question. Thus, Baron Liebig compares with one another the results of about 70lbs. of nitrogen to a given area in the form of sal-ammoniac *alone* in *one year* (1843); of about 176 parts in the form of sal-ammoniac *with phosphates*, applied partly in 1844 and partly in 1846 and the increase of produce taken over the three years, 1844, '5, and '6; and of about 15 parts of nitrogen in the form of guano applied only in one year (1844), and the increase taken over that and two succeeding years; and upon the comparison thus made, he founds conclusions as to the effects of the different states of combination of the nitrogen in the manures, or on that of its admixture with other constituents. But, besides the experiments above alluded to, in which Kuhlmann applied about 15 parts of nitrogen to a given area in the form of guano, he made another, side by side, with the same guano, but with double the quantity, yielding therefore 30 parts of nitrogen to the same area. The result was, that where the smaller quantity of nitrogen was used, 72 per cent. more increase was obtained for a given amount of nitrogen than with the larger; yet, it was the action of the smaller quantity of guano applied in one year, and acting over three, which Baron Liebig selects to contrast with the large amount of nitrogen applied in different seasons in other manures, attributing the difference in result to the action of the associated mineral constituents in the guano. In another of Baron Liebig's illustrations on the same point, although 74¾lbs. *more nitrogen* were supplied *with phosphates* than were given without them, he attributes the increase of produce in the one case over that in the other, to the addition of the phosphates.

Further, Baron Liebig explains the efficacy of a *fresh* supply of salts of ammonia, when a still unrecovered supposed residue of nitrogen from previous applications would be without effect, by supposing that the mineral constituents have been exhausted by the action of that portion *before* supplied which had been active, and that by the action of *fresh* salts fresh mineral constituents were set free from the soil, and thus the conditions restored for the supplied nitrogen to become effective. How far such an explanation is probably correct, may perhaps be judged of by the results which have been recorded on the growth of barley after ten years of turnips differently manured.

"During the growth of the ten turnip crops, some of the plots had received every year enormously more of all the mineral constituents of the barley crop, except silica, than the turnips removed. The latter removed no silica. So that, besides the excess of other mineral constituents, there was an accumulation during ten years of available silica. Yet with all this unusual accumulation of the necessary mineral constituents, the residue of nitrogen unrecovered in the increase of turnip crop—amounting as it did in some cases to more than the largest dressing we ever applied in one year to a corn crop—gave us, where there was the largest amount thus unrecovered, during three successive years of barley, an average annual increase of only 5¾ bushels of corn, and between 300 and 400 lbs. of straw per acre. On the other hand, the addition of fresh nitrogen, in the form of salts of ammonia and nitrate of soda respectively, gave at once an increase of 33 and 35 bushels of corn, and 4,903 and 5,531 lbs. of straw. And although the addition of the fresh nitrogen in the form of ammoniacal salts yielded an increase of 33 bushels of corn and 4,903 lbs. of straw, which together would contain only about half the nitrogen supplied in the manure, yet the remaining half, notwithstanding the still enormous excess of previously supplied mineral constituents, gave in the succeeding year only 6¾ bushels increase of corn and 646 lbs. of straw. Are we then to conclude, that, under the circumstances stated, the supposed large residue of nitrogen supplied to the turnips, was inefficient only for the want of available minerals? and that the striking effects of the newly-supplied lesser amounts of nitrogen were chiefly due to the action of the acids of the ammoniacal salts and of the soda of the nitrate, in rendering available the otherwise locked up mineral constituents within the soil? The utter inefficiency of even a liberal *direct* supply of mineral constituents, to recover, in the second crop of wheat after nitrogenous manures, more than an insignificant proportion of the supplied nitrogen not recovered in the first, has been forcibly illustrated in a former paper."

By the concurrent testimony of field experiments of very various kinds, the conclusion has been arrived at, that full crops of barley cannot be grown unless there be, by some means, available nitrogen provided within the soil. In practice it is frequently convenient to increase the produce of the barley crop by the direct application of portable nitrogenous manures. It is very desirable, therefore, both in a practical and scientific point of view, to have some means of judging what is the probable proportion of the nitrogen so supplied in manure which will, on the average, or under given circumstances, be recovered in the immediate or successive increase of crop obtained. The experimental evidence which has been collected bearing upon this point also throws some light upon the influence of season and manuring on the per-centage of nitrogen in the barley crop, and upon the amount of nitrogen obtained annually from a given area without manure.

Before speaking of the direct evidence which analysis has supplied in the case of the experiments on the growth of barley without and with nitrogenous manures, the evidence and reasoning of others as to the proportion of the nitrogen supplied in manure, which is recovered in the increase of produce obtained by its use, may be first briefly noticed. In his paper in the *Journal* of the Royal Agricultural Society of England, before referred to (vol. xvii. part 1), Baron Liebig deduces from Kuhlmann's experiments on *hay*, that when ammoniacal salts were used *alone*, there was an apparent loss of four-fifths or three-fourths of the nitrogen employed; but that, when *mineral constituents were also added*, there was no such loss, but a *gain* from natural sources. To show this *gain*, the instance is quoted in which Kuhlmann used about fifteen parts of nitrogen to a given area in the form of guano. Adopting the same mode of calculation, however, there would be a *deficiency*, instead of a gain of nitrogen in the increase of produce, where Kuhlmann applied it in the form of the very same guano, but in just double the quantity to a given area, as in the former instance. In another of Kuhlmann's experiments, too, where a still larger proportion of nitrogen was employed to a given area of land in the form of sal-ammoniac, but *mixed with phosphates*, there would be, still adopting Baron Liebig's mode of calculation, a loss of more than 56 per cent. of the supplied nitrogen. In fact, so far as the evidence and arguments adduced bore upon the question, it appeared that to attain the result of no deficiency of the supplied nitrogen in the increase, but a gain over that supplied in the manure, the farmer must employ it in quantity which, in a practical point of view, was quite insignificant. The real bearing of the evidence which Kuhlmann's experiments supply is not the question here. It is, too, hardly necessary to reiterate an assent as to the essentialness of a liberal supply of the necessary mineral constituents of our crops. It has been frequently shown in former papers, what, under an ordinary course of practical agriculture, with rotation, *as it is*, are the usual circumstances of the removal and return of the mineral constituents, and what the requirements for their direct supply.

The experiments of Kuhlmann above alluded to were made upon grass. The direct results to be now noticed have reference, as already intimated, to the experiments in which barley was grown for six consecutive years on the same land, by different manures, of which the same description was applied to the same plot throughout the six seasons. More than one hundred nitrogen determinations were made on the barley corn or straw, grown respectively with and without nitrogenous manures.

Referring briefly to the influence of varying season and manuring, upon the per-centage of nitrogen in the produce of barley, it appeared from the results of the few seasons over which the experiments extended, that, so far as the crops grown without nitrogenous manure were concerned (that is, those which ripened best), the tendency was to give the lower per-centage of nitrogen, the higher the character of the crop, and *vice versâ*. The same has been found to be the case with wheat; but, as with the latter, so with barley, the rule is not without exception; it seems only to apply, on the average, as our seasons go.

When comparing the produce of the different seasons, grown by *nitrogenous manure*, the rule just indicated is not so clearly borne out; but, as the influence of even the smaller amounts of the nitrogenous manures which were employed, was to produce over-luxuriance, and depreciate the proportion and the quality of the grain, that is, to be unfavourable to perfect maturation, the apparent exception was rather a confirmation of the assumption, that high maturation and low per-centage of nitrogen were generally, with the average of our seasons, coincident.

"That we should get the higher *qualities* of crop indicated with the lowest amounts of produce per acre, is perfectly consistent with the practically admitted fact, that the *sample*, particularly of barley, is, on the average, the better the smaller the amount of crop. This smaller amount of crop is coincident with the relative deficiency of available nitrogen within the soil; and, with this higher quality of sample obtained with a low relative provision of nitrogen in the soil, we have a tendency to low per-centage of nitrogen in the most valuable descriptions of the grain. But *quality* cannot in practice be bought at so great a sacrifice of *quantity*. And it is seen that, when we increase the *quantity of crop* by increasing the relative amount of available nitrogen in the soil, it is generally depreciated in the admitted characters of *quality*; and at the same time the per-centage of nitrogen is increased. Further, the tendency to diminished quality and increased per-centage of nitrogen on the one hand, with increased amount of crop on the other, would appear to be the greater, the more excessive the supply of nitrogen beyond that which in the average of seasons can yield a well-conditioned and healthily-ripened crop. Barley indeed, from its comparatively limited hold on the soil, and its small and weakly straw in proportion to the weight of corn it has to carry, is, so far as favourable ripening and good sample are concerned, more sensitive to vicissitudes of season and to high manuring than wheat; and it is with the greater variation in degree of maturation in the former than in the latter, in one and the same season, with different proportions of available nitrogen provided within the soil, that we have, at the same time, a greater variation in the *per-centage* of nitrogen in the produce depending on the manure employed." It would appear, too, that we cannot, keeping within the limit of healthily-matured full crops, increase the per-centage of nitrogen in our barley grain much above a comparatively low amount, as our seasons go.

The next point of interest is, as to the amount of nitrogen annually taken from the land in the produce, where none was supplied in manure. "The highest amount of nitrogen thus stored up from the unaided soil and season resources was in 1854—namely, 32¼lbs. per acre; the lowest amount was 17⅛lbs., in 1856; and the average annual yield, taking the mean of the six years, was about 28⅛lbs. It may be mentioned, that this latter amount is more than that annually deposited in rain and other aqueous depositions, in the forms of ammonia and nitric acid. Investigation—of which there is at the present time much going on in reference to this subject—has still to determine the source or sources of this annual excess of assimilated nitrogen, beyond that supplied in the combined form, in the measured and analyzed aqueous depositions. Whether it be due to exhaustion of previously-accumulated nitrogen in the soil, to direct condensation by the latter of the nitrogenous compounds occurring in the atmosphere, to the formation of ammonia or nitric acid within the soil at the moment of the evolution by chemical changes of certain elements in the nascent state, to the accumulation of combined nitrogen from the atmosphere by the plant itself, or to its assimilation of the free nitrogen of the atmosphere—whether, or in what proportion, these several possible sources may take part in the result, is as yet a great problem, open for solution."

With regard to the important point, of the proportion of the nitrogen supplied in the manure, which was recovered in the increase of barley corn and straw obtained by its use, the general result, omitting all references to detail, may be very briefly stated. In the experiments in question, the analyses showed that, even when the nitrogen supplied in manure was the less excessive, scarcely 40 per cent. of it was recovered in the increase of produce, taking the average result of several consecutive years. In some of the individual years, there was nearly, or even over, 50 per cent. recovered—that is, when the tendency to corn was the highest; in others, there was less than 30 per cent. of the supplied nitrogen recovered in the increase of crop obtained.

" In thus speaking of the proportion of the supplied nitrogen recovered in the immediate increase of the barley crop, our form of statement must be understood as only representing the practical result, as measured by the difference between the amount of nitrogen in the produce with nitrogenous manures, and in that without them. It must be admitted that we have not the means of deciding whether or not the crop grown by nitrogenous manure has assimilated the same amount of nitrogen from other sources, as that grown without it. We cannot say, therefore, whether the soil has to render an account of more or less of nitrogen than that indicated by the column of the amounts unrecovered in the increase of crop. The proportion unrecovered in the immediate increase is, however, obviously very large. It may be supposed that this at first unrecovered amount is still available to after-crops. We may as alternatives assume, that a portion is locked up in the soil in a practically-unavailable form—that it passes into states of combination in which it can be drained away, or evaporated from the soil—or lastly, that in some form or other it is got rid of by the functional processes of the growing crop. The actual or relative amounts of the several influences, science is not yet able to determine."

" It is obvious that, at any rate, some of the apparent loss to immediate increase of the supplied nitrogen will be due to the unequal distribution of the manure, in relation to the under-ground feeders of the plant. If this were all, however, the unrecovered nitrogen in a first crop should be sooner or later available to those which follow. But one thing is certain, that, even taking together the increase in several immediately succeeding after-years, the *proportion* then recovered, of the previously unrecovered nitrogen, is very much less than the *proportion* of the whole supplied, which is recovered, in the year or years of its application. This is even the case when the provision of the necessary mineral constituents is very liberal. Indeed, a much less amount of nitrogen newly supplied in the form of salts of ammonia or nitrate of soda alone, will give a greater increase of produce than the larger amount of supposed residual nitrogen, with direct mineral manures in addition. It cannot well be supposed, therefore, that the amount of the supplied nitrogen unrecovered is simply due to its greater distribution, or the exhaustion of mineral constituents, though still remaining, so far as state of combination is concerned, *available*."

" As a fact in practical agriculture, it must be concluded, that the nitrogen supplied in manure for full crops of grain, is not recovered in the increase within any moderate period of time. We hope on an early occasion to add to the statistical results in this and in former papers on other crops, those relating to the proportion of nitrogen recovered in increase, to that supplied in manure for *grass*. But even with all the evidence which the facts of the field will be able to provide, the problem will still remain—of the exact explanations to be given by science, of the loss which is experienced by practice."

THE USE AND ABUSE OF ALUM IN BREAD-MAKING.

Every now and then, of late years more especially, we are terrified with some household cry. By some means or another we are found to be slowly, perhaps, but systematically killing ourselves. We are living over sewers; have heavy curtains to our beds; or arsenic-tinted papering to our rooms. We delight to season our food with condiments that are little less than rank poison; and cling to essences and sauces that, like the fox of the Spartan boy, are eating out our vitals. Even the plainest fare is not without its alloy. Water itself is declared to be impure; the best meat to be diseased; the finest bread "doctored," and the nicest beer drugged. It is not only Damocles in Grosvenor-place who sits down to dinner with this drawn sword of danger hanging over him. Tradesmen mutually return the compliment one on the other; while Hodge carves a crust that, if he did not bake it himself may be as much tampered with as anchovy paste or London porter.

Indeed, the sins of the baker are a very old story. There is scarcely a man but who knows too well how even the best bread is manufactured—how it comes to look so white, and so fine, and so "crummy." Like the state prisoner, who believes his doom is a secret death in his dungeon, he swallows every mouthful in fear and trembling. Most probably there is something wrong in it. Only when far removed from cities does he breathe again. Over the home-made heavy brown loaf of his country cousins can he eat, drink, and be merry. As he cuts the solid slice from off it, he ejaculates mentally, or may-be distinctly enough, "Ah! this is the thing; there is no alum here I can see." When Coleridge's taciturn friend greeted the dumplings as "Them's the jockies for I!" he had, no doubt, been suffering from an attack on baker's bread.

But after all, is alum this terrible curse we take it to be? Are we really justified—as happened ere now—on finding its presence in our quartern loaf, in rushing off to the baker's house, and pulling it, oven and all, about his ears? Or shall we, more reasonably, be content to indict him, and fine him, and ruin him? Dr. Odling, at a recent meeting of the Society of Arts, actually requests us to pause ere we do anything of the sort. In a paper he read some fortnight since, on the chemistry of bread-making, he discourses in this wise—He is speaking of some secondary varieties:—" But these flours, in proportion to their glucogenic tendencies, do not make good bread, and it becomes an object with the baker to oppose the glucogenesis as much as possible. Hence, in making bread from certain kinds of flour, he finds it necessary to add alum, or lime, or bean-meal, or some corrective substance which, from experience, he knows will cause the flour to yield a loaf presentable to the eye and agreeable to the palate."

This has long been the popular, and, as it would appear, not erroneous opinion. It receives more confirmation a little further on:—"One very important use of alum is to prevent any undue deterioration of the starch during the process of raising and baking. If we mix a solution of starch with infusion of malt, in the course of a few minutes only the starch can be no longer detected, being completely converted into dextrine and sugar; but the addition of a very small quantity of alum either prevents altogether, or greatly retards, the transformation. The action of diastase upon undissolved starch is very gradual, but here also the interference of the alum is easily recognizable. Bread made with infusion of bran or infusion of malt is very sweet, sodden, brown-coloured, and so sticky as almost to bind the jaws together during its mastication. But the addition of alum to the dough causes the loaves to be white, dry, elastic, crumbly, and unobjectionable, both as to taste and appearance. I have found that flour, which of itself was so glucogenic as to yield bread undistinguishable from that made with infusion of malt, could, by the addition of alum, be made to furnish a white, dry, crumbly, eatable loaf."

The testimony of Liebig and Payen are both quoted to warrant the use of alum; and Dr. Odling thus sums up in favour of the practice:—"In the absence of any evidence, either from fair inference or direct observation, that the introduction of small quantities of alum into bread is prejudicial to health, it seems that the practice is not so reprehensible as is usually maintained. It certainly improves greatly the quality of bread made from inferior flour, and, in a politico-economical point of view, is important, inasmuch as it renders a large quantity of flour suitable for human food in the form of bread, which flour would otherwise have to be devoted to less important uses."

Still the doctor had it by no means all his own way. He rather takes it for granted that we really know of no ill effects arising from the use of alum. Dr. Snow, on the contrary, "had many years ago come to the conclusion that the practice of putting alum into bread was a fruitful source of rickets amongst children. It appeared to him that rickets were more prevalent amongst children in London and the south of England than was the case in the North or in Wales, where the children were just as overcrowded and as deficiently supplied with milk as in London. He believed that for grown people the admixture of a little alum was not very injurious, though for children it was so."

Then again, Mr. Pittard, "And many other medical practitioners had a settled belief that alum in bread was injurious to mankind. Sickly children had been found to improve marvellously upon baked flour, whilst they pined away upon soaked bread. The chemists spoke slightingly of the medical men because they did not pretend to know the chemistry of the question, and said that they were ignorant that the alum was decomposed in the making of bread. Even if that were so, it did not prove that the alum was rendered innocuous; if alum was resolved into alumina and sulphuric acid, he did not know whether alumina might not be injurious in the body. It was a fact worthy of note that, although alumina was one of the most plentiful substances on the earth, yet it did not enter into the composition of any organic bodies whatever, whether animal or vegetable. This alone was reason against the introduction of alum into food. With salt it was very different. They might be told that the chemical effects of alum on the animal system were not extraordinary, but there were chemical effects to be considered." Dr. Normanby, Mr. Varley, Mr. Johnstone, and Mr. Malone also spoke to the injury arising from the constant use of alum. But Dr. Gilbert "suspected the truth lay somewhere between the two extremes. He was not disposed to think that alum could be, with advantage to the consumer, added to really good flour, for the purpose of bread-making. On a large class of constitutions he thought there was medical testimony enough to show that alum, or alumina, in bread acted injuriously. With such it induced constipation, and this was a fruitful source of more serious disease. On the other hand, it was to be remembered, that owing to the seasons, which we could not control, a considerable portion of the flour, which must be consumed by somebody, was not in a perfect condition to yield a bread of good texture and other requisite characters without the aid of some extraneous matter; and if the bread were not of suitable texture and condition, its digestion would be imperfect, and if digestion, then assimilation also. The question was then, so far as related to alum, whether or not the benefits which it undoubtedly produced, so far as the physical and some other characters of the bread were concerned, were greater or less than the evils he believed it in many cases induced. The subject required much careful consideration; and if a substance or method that would have the same effects in retarding the chemical changes to be avoided in flour and bread, and which at the same time was undoubtedly innocuous, could be generally adopted, few would then uphold the use of alum. The suggestion of Dr. Odling to use lime-water, as recommended by Baron Liebig, was deserving the serious attention both of bakers and medical men." Mr. Dugald Campbell went more decidedly with the baker, and was "prepared to say that such a quantity of alum as would do an injury would render the bread unsaleable." And Mr. Callard, himself a baker, confirmed this:—"Dr. Snow had mentioned a quantity of alum as having been found in bread that he (Mr. Callard) could not suppose to be possible. Such bread could not possibly be eaten."

We regard the points of this discussion as not without interest, and we present them accordingly to our readers. The conclusion would seem to be that the evil has been greatly over-rated. It is very certain that some of the much-noised alum discoveries have been made upon tests anything but reliable. Dr. Odling characterized the means often employed as a disgrace to chemistry, and in showing up "the loose speculation," and "groundless defamation" of gentlemen "gasping for notoriety," had throughout the best of the argument. Still the use of alum in any degree is but at present a necessary evil. Mr. Callard, the baker, in admitting it was extensively used, said the trade would be glad if scientific men could point to some less objectionable substance, and the public will readily echo this request. We gather from what we heard, that on the whole the common opinion as to alum is a very correct one. It is injurious, and is mostly to be found in the best-looking bread. Dr. Snow has detected much less in the bread supplied to the lower classes, though he had expected that what were called cheap bakers used more than those who supplied May-fair, but such was not in reality the case.

It is a question, then, that concerns us all, and one that we trust such men as Dr. Gilbert and Dr. Odling have as yet by no means done with. They may "reform it altogether."

THE MANAGEMENT OF FARM HORSES.

It is not my intention to enter into any lengthened disquisition upon the management of farm horses; but, in accordance with my usual limits, I shall confine myself to the simplest part of the question—their every-day management whilst pursuing their regular work.

I will first notice the Stable or Shelter. Upon this point great difference of opinion exists amongst the best practical farmers. Unquestionably, if a horse is kept in a warm stable, he consumes less food; but then he is more liable to colds, and subsequent inflammations, from exposure to the variations and inclemencies of the weather in this fickle climate of ours: whereas, by being fed in a comfortable stable or shed, and having the run of a warm well-sheltered yard, he is kept in a more hardy state throughout the winter or cold weather; and in summer, the cool grass-field or the shaded yard is far more healthy after a heated day's work, and of course much to be preferred to the hot, close stable, however freely ventilated it may be from above, as the exposure to draughts of air from below ought most certainly to be avoided.

On farms having a deficiency of grass-lands, I should advocate the turning of the cart-horses, after their day's work, during the hot months of summer, into a cool paddock, there to be supplied with artificial grasses, after their usual feeding. The great aim should be to keep them in an equable, healthy state; and the best judgment of the farmer will be constantly required, to provide such food and shelter at the return of the various seasons as tend best to secure such a desirable end.

The most important part of the subject is the *Feeding* and *Food* of the Farm Horses in the different seasons of the year. Farmers perhaps err more upon this point than any other, and in a great degree from their inability, on many farms, to control ignorant or headstrong farm-servants, to whom much of the produce of the farm is frequently open, the waste of food and the irregularity of management often trying the temper of the most hearty and good-natured master. Before proceeding, I give the following extract. Spooner says: "The stomach of the horse is comparatively small, holding about three gallons; whilst the ox possesses no less than four stomachs, the first of which is considerably larger than that of the horse. This difference shows—what, indeed, the habits of these animals also demonstrate—that whilst, on the one hand, the ox is constituted so as to consume a very large quantity of food at a meal, the horse, on the other, is adapted to consume a moderate quantity, and often. If such a mass of food as is often found in the maw of the ox, were contained in the stomach of the horse, it would be impossible for this animal to perform those severe exertions which are frequently expected from him, from the loaded stomach pressing against the diaphragm—the muscle of respiration—which would materially interfere with its action. It should also be borne in mind that the progress of chymnification is accomplished by one-half of the stomach only, thus affording an additional reason why a large mass of food cannot be conveniently taken by the horse at one time." This extract contains the true principles upon which the feeding of the farm-horses ought to be regulated. It is manifest that it should consist for the most part of "concentrated food, such as grain;" and hay, straw, and roots may be supplied to the horse occasionally, but they are not his natural food.

Feeding and Food.—The common every-day experience of farmers has, I think, decided the point as to feeding. Every one adopts the system of manger-feeding, and almost universally by means of chaff and corn, followed by rack-meat consisting either of clover or meadow-hay. The horse will, of course, more readily supply himself from partially-prepared food than otherwise. Hence cut chaff is so desirable, as also split beans or bruised oats, and the like; for they have in this state the double advantage of requiring less mastication, whilst at the same time the animal derives the greater nourishment. I need not say that oats and beans have long stood prominent as the best corn-food for horses; and although many deviations have occasionally been followed by practical men, they invariably come back to the simple food of hay and corn. It is true that recently we have had various compounds brought before us; and, by an unlimited process of puffing, much is brought into consumption as food for horses. I am inclined to believe that these mixtures are good, but they are abominably expensive, being chiefly made from the meal of oats, beans, peas, barley, and Indian corn, largely mixed with the locust bean, dried and powdered, and sold at a price far above its original value. The usual allowance of corn for a farm-horse in regular work is generally in the proportion of one-and-a-half bushels of oats to two pecks of beans per week, which is ample, given with wheat, chaff, or finely cut hay and straw. My own practice is to grow for them a sufficient quantity of oats; and I give them an almost unlimited allowance of chaff, cut from oat sheaves by Cornes' machine. I am not prepared to say it is the most economical course, but I do think it one of the most healthy systems pursued, aided by a small supply of clover hay at night during the winter, and in the early spring by a few mangold roots, or Swedish turnips, or carrots, daily. In the summer the same feeding of chaff is given; and they are either turned out to be grazed in the grass fields at night, or are supplied with artificial grasses in the fold-yard. Their general management should consist of careful grooming. Great inattention is given to this point almost universally; anything will do for a cart-horse, if he is only ready for the morning's work; and galled shoulders, cracked heels, contracted feet, with divers other sores and ailments, are the result. Their stables and hovels should always have a plentiful supply of litter in the winter; and I think they should have a cool yard, paddock, or grass field for the summer. Their food should be supplied to them at long intervals, *i. e.*, a good feeding, as above, should be given in the early morning, a slight refreshment at noon—either by a nose-bag or a return to the stable, if near—and a prolonged feeding in the evening. All heating or injurious food must be avoided, or very sparingly given—as tailing wheat, barley, bran, &c. The artificial grasses should not be given to them in a fresh state. Tares ought to be mown some hours beforehand, as also should lucerne and sainfoin, both most excellent grasses for horse-fodder. If given in their fresh state, they should be passed through the cutting-box with good oat, or wheat, or barley-straw as a corrective.

I shall now only notice one other important part of the subject—it is the mode and time of working cart-horses. It is highly important that the horse should be in as close contact with his work as possible; the nearer the work, the easier will he perform it. It is most reprehensible to see, as we sometimes do, three, four, or even five horses yoked in length to a common plough. It is infinitely preferable, where it can be adopted, to work them in pairs, or abreast; mine are frequently worked four-abreast, in various fallow work; most soils can be ploughed with two good horses abreast. The gearing should be light and simple, and the practice of driving at plough should be got rid of generally; a pair of horses, guided by either a single or double line, is quite sufficient. The question of one-horse carts *versus* waggons—of varieties in ploughs, scarifiers, harrows, and rollers—will very properly come into consideration in the economical working of cart-horses; but I cannot stay to discuss it now, and shall merely notice the time of working. It is customary in many parts of the kingdom for the horses to be out at dawn during the winter months, and at six o'clock in the summer, to return at two o'clock, for the day's work. This is good; but it is often attended with inconvenience in many seasons. In fallow-time, it is requisite that the turnip-sowing and manuring, &c., should go on simultaneously. In these months they should be rested at noon, and then worked till five or six o'clock, as required. Many prefer two yokings generally: this is a great loss of time on many farms, where the farmstead is distant. I cannot say I experience much loss or inconvenience from pursuing the practice of only one rather long yoking of nearly eight hours, in summer, with a slight rest at noon, and a mouthful or two of grass or clover, and in the winter a yoking of seven hours, without food; but I do not recommend it. Great care should be taken that the horses, when in work, should not be allowed to stand too long exposed to cold or biting winds. Most of the inflammatory diseases take their rise from such exposure. They should be steadily worked, and from their work be brought at once to the stable, and their feeding and grooming at once proceeded with.

PRACTICAL FARMER.

THE MANAGEMENT OF FARM HORSES.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—In the very excellent article which appeared in your last week's paper upon the above subject, by a "Practical Farmer," there are one or two points which I can hardly agree with, although I am aware that they are customs generally tolerated in this country, and will be approved by many. The first point to which I will allude, is "the stable or shelter." Your correspondent seems to approve of the plan of turning the horses out into a yard after being fed in the stable. Now, with the unsatisfactory state of many of our farm buildings, this may be the more preferable of two evils; for I am quite convinced that nothing could be worse than to keep horses tied up all night in a low, close-roofed stable, yet exposed to sharp draughts of air from defective weather-boarding, not divided from one another by stalls, and standing perhaps upon a whole week's accumulation of their own muck; but when we find a high, well-ventilated, brick or stone-built stable partitioned off into proper stalls for each horse (which not only tend to prevent draughts, but to prevent the animals from kicking or disturbing each other), with the floor properly formed, with a gutter behind the horses, and the manure regularly cleared out every morning, I think there can be no question of this being preferable to turning out into a yard, in the winter season, horses that have been heated to perspiration during the day. I am aware that as much liberty as possible is natural, and congenial to the disposition of every animal; but when we transgress the inclinations of nature, by subjecting the horse to the drudgery of work, a corresponding regimen becomes requisite. Nature clothes every animal according to the climate, and its natural requirements; and I am persuaded that when a horse is every night exposed to cold, that he becomes clothed with a greater quantity of hair, and consequently more liable to perspire when at work. I have also proved that by keeping horses constantly tied up in such a stable as I have described, that both accidents from each other, and diseases, are much less frequent, and particularly accidents, when new and strange horses are introduced amongst them. The other point to which I would allude, is the system of going one yoking a day, a system which I very much disapprove, considering it to be quite inconsistent with justice to the animals. The circumstances which I believe have given rise to, and still tend to support the custom, are inconveniently placed buildings, the unsuitable distance of labourers' cottages generally from their work, and the supposed saving of time, in not unyoking and yoking in the middle of the day. Now under the existing state of things, much of this reasoning may be quite plausible; but there is no reason why such things should exist. I consider it as unnatural an act as one can be guilty of to take out horses at six o'clock in the morning and work them until two o'clock without tasting food as many do; but the truth is they do not work; and the fact is, they cannot work constantly all that time, but when at plough, &c., stand at the ends at least one-third of their time. When horses are kept constantly going—as when in harness they always ought to be—there is less chance of their taking colds or being exposed to inflammations. The men will tell you that they plough an acre a day (which, however, they seldom do), and that's enough, and that they cannot do more by two yokings; but I know that however much is to be done by one yoking, more is to be done by two, with greater ease to the horses. Upon some lands from half-an-acre to three-quarters will be a good day's work, whereas upon others an acre and-a-half can be done with comfort. Men have just to consult their own feelings in order to judge of those of horses, and know whether more work is to be done in one yoking of 8 hours, without refreshment, or by working 9 or 9½ hours divided into two yokings, by 2 hours to feed and rest in the middle. Some will urge the loss of time going to and fro, yoking, and unyoking, &c. I am quite aware that there is much more time spent thus than is required, simply on account of the unwillingness of the men to fall in with the two-yoking system; with activity very little time need be wasted in harnessing and yoking horses. Your correspondent very justly remarks that two yokings are also much more convenient, the afternoon being frequently the best time to harrow for the destruction of weeds, &c. The stomach of the horse, he also truly says, is small, and unfitted for being overcharged with large quantities of food, at long intervals; and here again the propriety of the two-yoking system. I have now only to add another remark, and one of considerable importance. It is this—that "custom is second nature;" and whether, with regard to the question of "stable and shelter," or that of "one or two yokings," custom will do a great deal; for we have often observed that by altering the usual routine of treatment to which animals are accustomed they will for a time suffer from the effects of the alteration, however advantageous it may afterwards prove, so much are we all creatures of custom, and particularly the lower animals, which are destitute of reasoning faculties. There cannot be a question, nevertheless, that however much custom may reconcile to any particular plan, that can be no proof of the superiority of the plan itself. Trial and observation have induced me to arrive at the conclusions I have now set forth. My desire is to avoid being influenced by prejudice on any subject, I shall therefore read with attention the views of any gentlemen who may choose to express themselves upon the subject, and whom you may be pleased to favour with a place in the columns of your valuable paper.

Your obedient servant,

W. A.

HOW TO MAKE THE MOST OF A HORSE.

It is true that Mr. Smith, of Woolston, is gradually getting rid of his cart-horses, and as certainly inoculating his brethren with a mania for steam cultivation. Mr. Fowler again declares his share of the good work done, and only cements a union with Mr. Williams, of Baydon, to render the process yet more perfect. We are, in a word, to plough by steam as surely as we thrash or travel by it. Nevertheless the horse is going by no means out of fashion. Good grooms and able veterinarians find places and practices as readily as ever they did. There is, indeed, just now a strong proof of the increasing value of horse-flesh to be seen in the sights of London. A young American is taking ten guineas a-piece from four or five hundred gentlemen to teach them how to treat their horses properly and rationally. He numbers, moreover, in his list, not merely princes, lords, and cavalry officers. The agriculturists have even given in their adhesion to him, and Allen Ransome, and his neighbour Barthropp, are going to school again—to learn how to deal with a clever hack or a mighty Suffolk.

But if there were further proof wanting of how much agriculture still respects the horse, we may go direct to head-quarters for it. By far the most popular paper in the last number of the Society's journal is devoted to his interests. There has been no article so much quoted, and none we should think so much studied for a long time, as Mr. Miles's Essay on Horse-shoeing. It is, moreover, a very model of what such a treatise in such a place should be. It is well known that half the contributions to the Journal are never read, simply because they are too long to read. The facility with which many writers can cover an almost unlimited number of pages is ever fatal to their success. Mr. Miles then starts under favourable auspices. The most occasional of readers will not tire of him, and the most careless must learn something from what he says.

There has been no such difficulty as the horse's foot. Our own tight boots and throbbing corns sink to nothing in the comparison. Old Bowler, with a heart like a lion, takes another tug at a dead stand, and goes gloriously away with his load—only pulling three of his shoes off in the effort. The phaeton, wanted in a hurry of course, to take the master to the train or the missis to tea, is brought round by a cripple—that has been just pinched in shoeing. And when our friend does manage to get his day with the hounds, he lands the young horse in a new road to a warning cry of "You've lost a fore-shoe!" Man meets with many a contrivance to lessen his own ills. He has better fitting, softer leather, and more general attention. But what attention does he give to the fit of his horse? Is there one in a hundred who does more than curse the smith, and change one blunderer for another? We may have a fancy for a certain sort of bridle, or be particular as to the sit of saddle, and give our own orders accordingly. But the shoe is left all to the mercy of the village Vulcan; probably because of its especial importance, and the force of the truism "no foot no horse."

Let us start here. We have all in our day had to complain of these blundering blacksmiths. Mr. Miles says:

"I am often assured, when talking of shoeing, that it is quite impossible to persuade country smiths to listen for a moment to any new suggestion, or to adopt any new plan; that they are an obstinate prejudiced race, and nothing can induce them to relinquish any of their old notions. I can only say, in reply, that this does not at all accord with my experience of them as a class; on the contrary, I have found them, for the most part, to be hardworking, painstaking men, evincing great interest in their work, and anxious to do it as well as they could. I do not mean to say that there are no exceptions, because I know there are; but the exceptions do not disprove the rule. .... I have been sometimes surprised at the readiness with which smiths have yielded their opinion to me, as soon as they found that I really knew what I was talking about, and that I could not only give them directions, but show them exactly how to carry them out in detail, and, if I had only possessed the brawny arm which is necessary for such a purpose, that I could have forged the shoe and fitted it to the foot. They all feel that horseshoeing is open to improvement, and as a class they are anxious for information that they can depend on, but they are naturally very shy of relinquishing plans which they have been long accustomed to, for others which they do not comprehend; but any gentleman who will take the trouble to acquaint himself with the principle and details of the plan which I advocate, will very soon become a welcome visitor at the forge, and while he is improving the condition of his own horses' feet, he will find that he is indoctrinating the whole district, to the great benefit of his neighbours."

Of course a man must be prepared to encounter some prejudice and leaning to conventional usage. Look, for instance, at the very first point in this delicate operation—the knowing way in which the shoe is at once wrenched off; as bad a practice as well can be. The finish, however, in Mr. Miles' eyes is a yet greater offence:—

"I shall, no doubt, astonish some persons when I assert that nearly all the evils incident to horse-shoeing are attributable to the affectation and dandyism of the smith, who is not contented to follow a necessary and useful art, simple in its mechanical parts, but calling for the exercise of some judgment in its application; but he must import into it dangerous difficulties and mischievous ornament; for instance, he assumes that a deep narrow fuller, with small nail-holes inclining inwards, and still smaller openings on the foot surface of the shoe, present a neat, trim appearance, and show that he is master of his art; knowing full well that nothing but long practice could enable any one to navigate a nail safely through a channel beset by so many dangers; but he entirely overlooks the fact that the power to do so has nothing to recommend it but the danger and risk attending the performance. Again, he imagines that a hoof carefully rasped all over imparts an air of finish to his work, of which he feels proud, forgetting altogether that he has removed a most important covering from the hoof, for which no amount of ornamental finish can compensate."

We shall not attempt to follow out the detail of Mr. Miles' system, the advantages of which are, that his horses are never lame, rarely throw their shoes, while their feet appear to last for ever. His golden rule, however, is that the shoe must be made to fit the foot, and not, as is too often the case, the foot cut out to the shape of the shoe. Further, *the shoe "must be nailed to the hoof in such a manner as will permit the foot to expand to the weight of the horse;* this latter condition will be best complied with by placing three nails in the outer limb of the shoe, and two in the inner limb between the toe and the commencement of the inner quarter; a larger number than five nails can never be required in any shoe, of any size, or under any circumstances, excepting for the sole purpose of counteracting defective and clumsy fitting."

The result of this is, that on the affirmative reading of the "no foot no horse," the animal turns out to be much longer lived than people generally suppose him to be. In November last, Mr. Miles had in work in his own stable six horses—the oldest of the lot, now forty years old, he has had just twenty years. "He would pass muster for nine or ten years old," and appears only to have the slight failing of not allowing any stranger to enter his box—Mr. Rarey, of course, excepted. The next, twenty-nine years old, is "the best hack" Mr. Miles ever rode. He bought him seventeen years since, when on the point of being shot, the smith having declared his feet so far gone that he could not shoe him! The third is twenty-one years old, and has been in his present place sixteen; the fourth sixteen years old, nine of which he has been with Mr. Miles; and number five, at thirteen, has passed eight years in the same service. The sixth was recently destroyed at the age of twenty-six.

This question thus grows upon us in importance. There is, perhaps, no other horse-keeper who could say as much, simply because no other man has paid equal attention to his horses. At ten or twelve years old the animal is now frequently condemned outright; whereas with only proper care there may be quite another ten or twelve years' wear in him. We can say from our own experience that the best horse we ever had was fifteen or sixteen when we bought him, and that after three seasons' good work, he sold for more than double the price he came in at. But then he was well cared for—shod in his own box by the best man in the district, his feet regularly stopped, and his somewhat battered legs soothed and saved—especially at first—in every possible way. We must let one more extract from the article before we tell how this is still to be done :—

> "If I were asked to account for my horses' legs and feet being in better order than those of my neighbours', I should attribute it to the four following circumstances: first, that they are all shod with few nails, so placed in the shoe as to permit the foot to expand every time they move; secondly, that they all live in boxes instead of stalls, and can move whenever they please; thirdly, that they have two hours' daily walking exercise when they are not at work; and fourthly, that I have not a head-stall or rack-chain in my stable: these four circumstances comprehend the whole mystery of keeping horses' legs fine, and their feet in sound working condition up to a good old age."

There is no one, we think, who will say such a paper as this is out of place in the Journal of an Agricultural Society. On the contrary, we believe it will be more read and better remembered than almost anything that has been published by the same channel. It is already issued as a shilling pamphlet; so that such of our readers who are not members may readily obtain it in this form. They must in no case be content with our mere opinion of its excellence. The essay is not distinguished as a prize paper, neither do we gather whether it was a volunteer contribution or written at the request of the editors. On any showing, it is worthy of some especial distinction. To a horse-rearing, horse-riding people like ours, a cure for lameness and lost shoes is indeed a blessing.

"LOIS-WEEDON" WITHOUT THE SPADE.

Why have not farmers in every county tested the system of wheat-growing in triple rows, with fallow intervals between? Mainly, we believe, because of the hand-labour digging it involves. It would require fourteen to twenty men, according to the nature of the land, to trench the intervals upon a hundred acres in the course of three months; and where shall we find the extra hands to do it?—not such as may always be had in winter for steam-thrashing and odd jobs, but stout, clever, and honest spademen. We say "honest" men; for the difficulty of getting a number of labourers to perform the task faithfully in every respect is a serious obstacle, even were the right sort of hands obtainable on such a large scale.

Are there no means, then, of *modifying the system so as to dispense with manual digging*, and yet realize the promised profit per acre? How far Mr. Smith has now advanced in freeing himself from dependence upon the spade and fork we do not know; but two years ago his little volume on "Lois-Weedon Husbandry" proposed to open a furrow by two turns with the plough in the middle of each interval, subsoil the furrow bottom, and after a winter's exposure, raise the crumbled subsoil and turn the pulverized furrow-slices underneath by means of a machine he has invented for the purpose. This ingenious "rotary digger," drawn by horses, was constructed, tried, and found to answer; but to what extent it has been employed in superseding manual forking we have not yet heard. In the absence of such a machine, could our *ordinary ploughs, subsoilers, and cultivators* be made to fulfil the object in view—which is, "to pulverise a certain small portion of the subsoil, year after year, and then mix it with the staple"? We thought it worth while to try, and accordingly commenced operations the year before last. Yet before we describe our management, consider how important is the experiment. For look at Mr. Smith's extraordinary results. He lays out in total expenses (including £2 an acre for rent) £5 16s. per acre on the "clay piece," and clears £5 14s. net tenant's profit—*when wheat is at forty shillings a quarter:* and on light gravelly land (clayed) gets £4 14s. clear profit from an expenditure of £6 16s. per acre. The average yield on the light land is thirty-four bushels per acre, and on the heavy land considerably more; in both cases *without manuring*. The straw is sold at forty shillings a ton; but as we cannot "dispose" of our straw at all, and should find farm-yard manure a costly article were a couple of sovereigns paid for every ton trampled down as litter or eaten by our stock, we deduct considerably from the above items, and take the prospective profit on good land (neither clay nor gravel) at say £3 10s. per acre. That is, a hundred acres permanently under wheat would gain us £350 clear annual profit, when the price is at the low figure of only 40s. per quarter; and at 50s. a quarter, the same presumed yield of thirty-four bushels is to bring us £5 10s. an acre, or £550 altogether. This was worth thinking about; for we doubted whether many agriculturists of our acquaintance could show a clear annual income of either £550 or £350 *from every hundred acres they occupied.*

Let us see how the scheme would work. Take a farm having three hundred acres arable, of very good friable loam, producing four-and-a-half or five quarters of moderately good red wheat per acre as a very fine crop, and of course less as an average; rent, forty shillings; tithe, six shillings per acre; and other burdens not peculiarly heavy. Growing every description of cropping, and in rotation almost at will—say, two-fifths, or one hundred and twenty acres, are wheat every year. As it is, this proportion of wheat, together with thirty acres of oats for the horses, and also a little piece of barley, is the largest breadth of white corn we can well grow: that is, it is all that the necessity for alternating white straw with green crops, &c., will permit and enable us to prepare for it. But if wheat is to follow itself year after year for any period of time whatever, the extent of ground we can prepare by rotation is no longer a limit to the breadth we may sow. Thus, unless there be other objections, we may have half, or more than half of our three hundred acres in wheat every year; and the remainder green and other crops, according to the character of farming and live-stock breeding or feeding that may be practised. If we choose to cultivate only one hundred and twenty acres of wheat as at present, this quantity of land will be set apart to produce wheat in perpetuity; while the other one hundred and eighty acres may be all in other crops, as roots, artificial-grasses, and beans, peas, and oats, in different and rather novel rotations. But for the sake of simplifying calculation, let us suppose that *one hundred and twenty acres of the most suitable wheat land is partitioned off from the farm, to be entirely self-sustaining and bear the three-row wheat every year*; while the remaining one hundred and eighty acres is managed *as if it were a complete farm in itself*—two-fifths of it under wheat, and the rest green and other crops, as at present. We shall thus have an auxiliary, 120-acre wheat-farm, as it were, not only yielding its harvest every year without manure, but producing a large amount of straw to manure and enrich what may be called the 180-acre farm. And either the same fields may be permanently kept under the three-row culture, or every year *a certain portion may be given up to the general cropping, and an equal breadth taken from the* 180 *acres*; so as to travel gradually round the whole or any part of the 300 acres with the new system. The proposal is, that on this 120 acres, independent of any green-cropping, fallowing, or sheep-feeding, we are to get an annual return of £1,140, by an outlay of £720—that is, we realize a clear profit or income of £420 a year when wheat is at only 40s. per qr., the gain rising to £660 when the price jumps up to 50s. This would be a good interest for capital, at any rate, if not exactly equal to the famous druggists' per-centage of "elevenpence-halfpenny in the shilling."

We are supposing, of course, that the cost and results will be similar to those of Lois-Weedon itself, with the necessary allowance made for the lower value of our straw. If it be found that we *can* thus raise our wheat crop year after year without manure, we shall certainly be drawing large quantities of manure (in the shape of straw) from the 120 acres, with which to fructify the 180 acres. And how extraordinarily must this great bulk of straw add to the productive power of the 180-acre farm, to which it is every year carried! Thus, by adopting this system, we are not only to gain largely in pecuniary profit from two-fifths of our land, but at the same time produce more corn, meat, vegetables, etc., from the other three-fifths: we shall raise the value of the thus more profitable farm, and create additional demand, and consequently better wages, for labour required in the treatment and manipulation of our extra crops and more numerous live stock.

There is something marvellous in increasing the total fertility of an estate *by means of a wheat crop acquired mainly from the atmosphere!* For that it is so at Lois-Weedon; let no one doubt. Mechanical tillage, without an ounce of manurial dressing, there maintains the productiveness of the wheat-fields, *with so slight a diminution of the fertile constituents of the soil itself* as not to be perceptible (we might almost think) in fifty years or a century; the land at present positively getting better, instead of gradually worse. It is a fact that Mr. Smith's twelfth year's crop is the heaviest and best he has had; and (let it never be forgotten) not only without manure, but without his bringing up or making use of an atom of fresh subsoil, only half the previously-attained depth of digging having been practised during the last three years.

"Well, but remember, Mr. Smith's results are obtained by exceedingly deep culture with the spade." Yes, on the stiff-clay piece; but on the light four-acre field, he only goes twelve or thirteen inches down with his forking; and it is possible to match this depth with horse-labour. His average yield on this gravelly land is thirty-four bushels, because, though unsuitable for wheat, it was dressed some years ago with the substance most required—that is, it received an application of clay, the charge for which is spread over a number of years. If we cannot get the expected amount of produce, owing to horse-tillage proving of inferior efficacy to that of the spade or fork, we may yet obtain, possibly, as large a surplus or *profit*, because of the lower cost of the horse-power, compared with manual operations; and "profit' is what we want. But we need not suppose that our production of corn for the community would fall short, by our thus reaping less yield per acre on the Lois-Weedon than on the common plan; because the former bears wheat *every year*, and the latter only twice in five years. Under the ordinary management, say, that each acre of the one hundred and twenty yields even the heavy crop of five quarters, that is ten quarters of wheat in five years, then a yearly produce of only two quarters from the new system will equal this amount in the same period. But we must grow more than this, in order to have a produce equivalent *in value*, not only to the wheat, but also to the crops of the other three years in the course. What crops, then, do one hundred and twenty acres usually bear every year, with a rotation admitting two-fifths to be in wheat? The quantities may be taken at forty-eight acres wheat, twelve acres oats, sixteen acres peas and beans, eight acres barley or potatoes, twelve acres clover, and twenty-four acres roots, &c. What is the worth of all this cropping; and had all been wheat, what yield per acre would have made a total produce of equal value? Now, without entering into minute figures, let us compare the corn crops at present prices, and reckon the clover, roots, &c., as worth, say £7 an acre; the value of the crops on the one hundred and twenty acres will be at the utmost about £1,200 or £10 per acre, and this is equal to the value of four quarters of wheat per acre on the whole area. So that, as far as mere worth of produce is concerned, every acre of the new system ought to yield at most some four quarters annually, in order that the national markets may not suffer. But of course, the principal consideration for the farmer is, will the expense of cultivation under the proposed system amount to less than that of the present fallowing, feeding, manuring, &c., and so leave a wider margin of profit? With Mr. Smith's expenditure, the yearly profit from this yield would be (as we have already said) about £3 per acre, when wheat is at the low figure of only 40s. The cost of our own operations by horse labour will appear in due course.

We have supposed that on a three-hundred-acre arable farm, one hundred and twenty acres are set apart for the growth of wheat year after year on the triple-row and fallow-interval method; the remainder of the farm (to make our calculation easy) being managed as if it were a separate and complete occupation. To reap a produce equivalent to that of the crops, which would otherwise be grown, we must obtain at most four quarters per acre; and the profit, if our expenses equal those of Mr. Smith, will be £3 per acre when wheat is only 40s. a quarter. Thus much we educed in our last paper. Land, such as we speak of, sometimes yields five quarters an acre, and has been known to carry six quarters as a remarkably heavy crop; but much less than these quantities on an average. We have no doubt, therefore, that Mr. Smith could get his average produce of four-and-a-half quarters by his system of manual digging; our proposed yield of four quarters thus allowing a difference of four bushels for the inferiority of horse-tillage to that of the digging-fork. We are not at all sure that a sovereign expended in subsoiling and scarifying by horse labour would not exert as great an effect upon the crop as if spent in manual digging, &c.; as we may perhaps find the greater number of pulverizings and stirrings in the former case of equal efficacy with the less frequent but deeper and more perfect action of the hand-tool. But say that the same outlay in horse-labour tillage will not bring so large a produce; nay, let us even assume that an amount of horse-tillage costing as much as Mr. Smith's manual digging is insufficient to produce the four quarters we desire; then we may moderate and reduce the proposal to grow *manure* as well as corn; and pay back the straw, instead of consuming it, for the advantage of the hundred and eighty acres. Let the system be simply "*self-maintaining.*" Every acre of an arable occupation is entitled to its share of the manure made at the farmstead; and call this quantity, on an average, 16 loads every fourth year—equivalent to 4 loads yearly. The wheat land may not lay claim to so much as a full average share of the manure consisting of its own decomposing straw, but intermingled, as it is, with enriching roots and oilcake, corn and hay devoured by the cattle, and expensively manufactured into its present applicable condition; but certainly it may receive *manure of equal value to the straw it has furnished*, and still be "self-sustaining." Giving up, then, the idea of replenishing the other portions of the farm (without cost) by our new wheat-growing, the 120 acres are simply to take care of themselves, consuming their own straw (or straw's worth) as manure, and yielding in return for our tillage 4 quarters per acre annually. The produce of straw will be 1½ or 2 tons per acre, which we may value to the farm-yard at 10s. a ton; and hence there will be 15s. or 20s. an acre to be annually spent in manure. The straw may go of course to the 180 acres which are under general culture, but must be paid for out of that portion of the business. Now, what amount of produce may be expected to arise from this sum applied in artificial manure? We might purchase 1½ or 2 cwt. per acre of guano, which (we suppose) would safely produce a gain of 5 to 7 bushels; or, rather, say a dressing of 2 cwt. of salt and 20 to 30 bushels of soot, which would probably gain much more. But remember that our crop stands upon only half the land; and the manure sown along the triple-row stripes, and missing the fallow intervals, would operate like an almost double dose, giving us say an increase of 1 or 1½ quarters beyond what tillage alone would produce.

It comes, then, to this: that if we cannot get 4 quarters an acre perpetually by tillage only, we can very likely do so by expending £1 per acre in manure; and being content with £2, instead of £3, as our clear profit when wheat is at 40s. Hence there is a good prospect for our 120 acres of Lois-Weedon wheat, few farmers clearing £800 a-year off a four-hundred-acre farm with such low prices in the corn market; and, at all events, the trial is worth making. Besides, judging from Mr. Smith's experience, and also from the indications of our own first-year's practice, we believe that the tilling, combined with the manuring, which is admissible, will raise *more* than the 4 quarters of wheat per acre for many years, if not in perpetuity; and that our profit will consequently exceed, instead of falling below that supposed.

There is another point in our favour, encouraging us to attempt Lois-Weedon husbandry on a large scale. While the crops in our district are occasionally bulky, and measure well in the barn, the weight and quality of the corn are always deficient, the usual sample being red wheat of 59 to 61 lbs. per bushel. Now, Mr. Smith finds that his roomy unconfined crop, having a stout straw, does not lodge and deteriorate when the July rains come down; the ears are colossal, and the kernels bold and beautiful, and being healthily-grown and nourished, instead of luxuriously forced and pampered, the wheat escapes pretty clearly from damaging blight and mildew; the result of all being that the highest prices are realised in the market. There will be a considerable gain, then, if we can make say 45s. per quarter of our crop, when by the common method of culture we could get only 40s.

And the system would leave blessings in its train; for suppose a field well cleaned and stirred, and worked 10 inches deep for say six years, bearing its successive grain crops without impoverishment, and then turned again to root and green-crop growing on an ordinary rotation; undoubtedly the abundant productiveness would prove the exhaustless benefit of repeated crumblings and atmospheric fertilizings, and the mangold and turnips, beans, peas, and oats would seize with a profitable avidity their special mineral nutriments that had lain unappropriated through so many years.

Perhaps we ought scarcely to mention the saving of seed, though (with 3 instead of 7 pecks per acre) this would amount to no less than 15 quarters; or the greater expedition in harvesting, the crop being what is called "all corn," carrying an extraordinary quantity of grain in rows so thinly covering the land. Neither need we hint at the continual opportunity and facility afforded for weeding, up to the very harvest day if we please. However, the more we ponder the scheme, the more adapted does it appear for meeting every exigency of the wheat plant. In winter, the furrow-slices laid up 5 or 6 inches high at every 5 feet, shelter the young plants from biting blasts, our crops being fresh and healthy when the blades on all other fields are purple and perishing. The deep-stirring and shaking of the ground in early spring stimulates the growth or bare maintenance of vigour of the wheat in spite of nipping frost; and the land, from the deep pulverization, arrests and retains moisture for the low-burrowing roots, fortifying them against the arid north-easters. The summer horse-hoeing promotes the healthy growth of the crop, pushing it on in times when other wheats are at a standstill or turning yellow. And the waving flag breathing freely because of the open-air intervals, the stems grow strong and sturdy, and ripen their grain for bread, instead of falling as crowded stalks do, to dwindle their food for the chickens.

Before detailing our method of wheat-growing on the Lois-Weedon principle, but with traction implement, instead of hand tools, we wish to impress upon our readers the considerations which led us to engage in the experiment. The proposal to have 120 acres out of 300 arable set apart for this culture has been shown to be highly *promising* in various respects; and we shall assume, for the present, that the contemplated yield of four quarters per acre can be annually reaped on our good wheat soil by means of the horse-tillage we should practise, and by the application of 15s. or 20s. worth of artificial manure—due in exchange for the straw carried away. This, as we said, according to Mr. Smith's experience, will give us at least £2 an acre clear profit when wheat is at 40s. a quarter, and £4 profit when the price rises to 50s.

Let us now inquire whether the scheme is "practicable," taking for granted that it would answer. And, first, are the cultural processes of such a nature, and so timed, that a farmer's ordinary force of teams and labourers could accomplish them at the proper seasons, and do so without neglecting the requirements of other crops or evading the general farm work? For of course it will be useless to test with a few acres a plan that, when adopted on a larger scale, would set fast all our horses and men at inconvenient seasons, and hinder us from properly cultivating the rest of our land. Now, in "getting-in" 120 acres of wheat by our common husbandry, there are say 50 acres to be ploughed, and 70 acres to be pared or scarified and cleaned as well as ploughed; and all to be well harrowed (some rolled) and drilled. These operations occupy fourteen horses (the force kept on the farm), say twelve days in doing the 50 acres, and thirty days in doing the 70 acres; that is, the whole preparation and wheat-seeding, from first to last, takes up forty-two clear days. But potatoes and mangolds having to be harvested, turnips stored, vetches got in, stubble carted, sold produce delivered, &c., a much larger period elapses in reality between the commencement and the completion of wheat-sowing. However, if we can get-in 120 acres of Lois-Weedon wheat by forty-two days' work of fourteen horses, our wheat-sowing will take no longer than at present; and we shall not be encroaching on other indispensable labours of the farm. Well, our present (second) crop of 10 acres was got-in the first week of October. The horse-labour for clearing the stubble and scarifying the intervals ready for the seed was equivalent to ten horses for one day, and that of harrowing, rolling, drilling, and afterwards grubbing and cleaning the old stubble spaces, equalled thirty horses for a day. This amounts to forty days' work; so that fourteen horses would have accomplished all in less than three days: whence we find that 120 acres would occupy them about thirty-four days. Here we have eight days in hand—or, in other words, have sown our wheat crop in one-fifth less time than is necessary under the common system. And "early sowing" being indispensable to success, we should begin in September; so that there is no fear of want of time for putting in all the wheat on a farm in this way.

Were we to farm on the Lois-Weedon principle, having two-fifths of our land in three-row wheat, we should have the remaining three-fifths under suitable green-crops and spring corn; but, for the sake of avoiding calculations as to the apportionment of labour at different seasons among the crops in such a new order of succession or rotation, we suppose the three-fifths to be managed precisely as though it were a farm to itself under the present husbandry. These 180 acres would have two-fifths—that is, 72 acres—wheat, ploughed for, &c., as at present, requiring eighteen or twenty days' work of the fourteen horses. Our total seed-time will be altogether ten or twelve days longer than before; against which we must remember that there will be less of other work than formerly, owing to the diminished area of the other varieties of cropping.

During the latter part of October, November, and December—beginning directly the young wheat is well up, and taking advantage of periods of dry weather—the deep-working of the fallow intervals must be done. We find that one set of five horses effects this on 10 acres in the course of two days; consequently two sets, or ten horses out of our fourteen, would finish the 120 acres in twelve days. The principal tillage operation on the other portions of the farm that would be a little delayed in consequence is only the ploughing of 72 acres of stubble for pulse cropping or for fallow.

As we shall see when we come to describe our process, only half of each interval is subsided the first time; and in January and February, or directly suitable weather follows the snow and frost, the same amount of horse-labour is required to complete the deep tillage which we adopt in place of digging. This latter twelve days' work for two-thirds of our horses come just at the time when spring corn has to be sown; but bear in mind that we have 14 horses, the full allowance for 300 acres arable, while (owing to the permanent setting apart of two-fifths of the farm for Lois Weedon wheat) the breadth of spring cropping is only that proper to a 180-acre farm—that is, three-fifths of the extent which would be grown were the whole 300 acres in rotation. Instead of 90 acres of beans and peas, oats, and barley or potatoes, there will be only 54 acres; and the time saved by having 36 acres less to get in, will go far towards sparing the teams for the second subsoiling of our wheat.

Tolerably dry weather being a necessary preliminary to each of these operations, not only for the purpose of effectively breaking-up the subsoil, but also to avoid "mauling" the wheat-rows and puddling the surface with the horses' feet; it may be objected that the weather will preclude our deep tillage, except in a remarkably dry season. We have had only two winters' experience; the present one unprecedented for absence of downfall and scantiness of water in ponds, wells, and drains. But in November, 1856, our first operation was stopped by rain and then snow, after half-a-day's work; in December it was completed, though needlessly done when the ground was too wet. The second operation was performed in February, and this note was made at the time—"Several fine days before, on which the work might have been done; and if postponed, there were still several more fine days which would have given an opportunity." This last winter the first operation was well done in December after prolonged dry weather, and the second was done in February after many days in which the soil would have broken up equally well, and succeeded by plenty of bright open weather. Supposing a heavy fall of rain to follow the wheat-seeding and snow-blasts to occur, with other weather unsuitable to the drying of the ground, there would necessarily be a delay in accomplishing the tillage; but as it is during a frost that the exposure of the subsoil is most desirable, we can very well wait until any "great wets" are over. We shall have the range of at least two-and-a-half months in which to get our first twelve days' work, though on an average half the number of days in these months are more or less "rainy;" and our second twelve days' work must be caught during January and February when the weather is not at all more propitious.

Rolling the wheat in March will take up very little of the horse-power of the farm. Scarifying the fallow intervals in April or May occupies three horses for two days in doing our 10 acres, so that two sets of three each would finish 120 acres in twelve days, or twelve horses (working four implements) in six days. This will not much interfere with the fallowing and other business going on upon the 180 acres.

Horse-hoeing the intervals in May, again in June, or whenever required, will be a short matter; for one horse finishes our 10 acres within one and three-quarter days, consequently four horses would hoe 120 acres in about five days.

Hand-hoeing and weeding the wheat stripes may be reckoned upon as demanding about the same labour as a similar number of acres on the common system, the wider spaces favouring the annual weeds, though there is less ground to be gone over. Employing a horse-hoe would of course diminish both labour, and expense.

In yoking the horses so as not to trample the wheat, in adjusting the scarifier so as to avoid casting clods upon the plants on each side, in arranging the reaping of such narrow strips of awkwardly-standing corn, there are little exercises of judgment called for; but our own experience proves that the whole management from beginning to end, is so simple that any good labourer engaged throughout one year may understand and properly execute the operations of the next.

For carrying off heaps of rubbish that may be raked or picked, and also for leading on manurial top dressings, &c., a "quarter cart" is necessary—that is, a cart with shafts fixed in front of one wheel, so that the horse "quarters," walking in the same track as the wheel, thus making a road of the "intervals" only. And for rolling the wheat rows or fallow intervals, as the case may be, it is requisite to have a roller made in two short pieces, arranged on one axle, but with a distance between them, the shafts being removable, in order that the horses (in length) may walk either in the middle or before one of the rollers, as required Only these two new implements need be constructed for our Lois-Weedon wheat-growing, the ordinary plough, subsoiler, scarifier, horse-hoe, ridge-harrow, and drill answering every other purpose.

Still further, as to the practicability of growing 120 acres of wheat, on the stripe system, upon a farm having 300 acres arable, it may be observed that the proposed mode of culture effectually provides for the eradication of couch and other creeping or perennial roots. Bunches of couch, docks, thistles, etc., may be dug out of the stubble after harvest, or from the rows of the growing crop; and the fallow intervals (embracing just half of the land) are stirred, pulverized, and the root-weeds picked off. But should the surface become thoroughly infested, in spite of all, the foulness may be extirpated after harvest, by paring and scarifying the whole breadth of the land, and harrowing lengthwise and crosswise too; obliterating the stubble-rows, it is true, and so taking away the guide-marks for the next drilling, but not preventing us (as we shall see) from hitting the right intervals, with our method of gauging the drill-row distances. But, seeing that each portion of the ground is summer or bare-fallowed every other year, no apprehension need arise of overmastery by ill weeds.

One minor difficulty we have not yet removed—headlands at both ends of a field are indispensable, for the horses and implements to turn on, in the winter, spring, and summer tillage; and no vegetable seems to covet the frequent rough usage of such a situation. Are we to try for a few stray ears of wheat, or plant potatoes with a coating of manure? leave the headlands to themselves, with the exception of cutting up weeds? or lay them down to permanent seeds?

So far, our papers on this subject have shown, we think, that growing the 120 acres of Lois-Weedon wheat by our system, on a suitable soil, is perfectly practicable; while the results, if at all in accordance with those of Mr. Smith, will be highly profitable and satisfactory.

In reply to a letter propounding our plan of horse-power tillage, Mr. Smith advised us to "say nothing about it till you have had two years' experience." This sound caution we are not following exactly; but, at any rate, we *have* had two years' experience of our method of deep-working the intervals by common implements, which was the chief practical difficulty to be overcome. And we say that our three-feet intervals of tough soil have been broken up and crumbled, and exposed to the atmosphere, to a depth of 9 or 10 inches, and that this desired end has been attained without ploughing up or otherwise damaging the wheat. Cleaning the stubble, and preparing the intervals for the seed, we have found to be simple and easy; and sowing the rows at the right distances apart has been twice done readily and correctly by a common drill. We have also kept accurate accounts of all the labour bestowed, in each process, on our 10 acres; and, having already performed the heaviest operations twice, can safely state what is the total cost of cultivation. Now, every item shall be adduced before we close this series of articles; but just at present we are insisting upon the feasibility and applicability of the system, and are anxious to exhibit its promising character: so we will only premise here that manual labour has been charged precisely what was paid for it, while half-a-crown per day is put down as the expense of a horse—certainly not too little, amounting as it does to £39 a year.

The whole cost of the crop of 1857 was £5 18s. 4d. per acre—including £2 for rent; 6s. for tithe; 9s. 10d. for rates, taxes, and 5 per cent. interest on the outlay; and £3 2s. 6d. as the expense of cultivation, in labour, seed, etc. In future years, various savings will be effected in the time spent in some of the operations; so that the total expenditure will never reach £6 per acre. What amount of produce is needed in order to repay this outlay? Three qrs. at 40s., or 2⅖ qrs. at 50s.; the value of the straw—say £1—to be given back in artificial manure. And all the yield we get in excess of this quantity will be our clear profit. Four qrs. annually, we have said in a previous paper, fully equal in market-value the acreage produce of the other portions of the farm, and at 40s. would give us, it seems, a profit of £2 an acre. What was our actual yield of 1857, we do not wish to state until the second (or coming) harvest has been thrashed; but it gave us a *satisfactory profit*, and enabled us to declare that if, *after the course of management the field was previously under, so much* could be grown by means of tillage only, we are satisfied that the produce in ensuing years might be raised to more than 4 qrs. by the tillage and the sovereign's-worth of manure.

What is the history of the field? It is a strong alluvial loam, not particularly rich, but low-lying, flat, and wet; the underdrainage being effected in a shallow and half-hearted manner, by means of several very old and a few new thorn drains. The rotation has been as follows: In 1850, red round turnips (fallowed and manured for, and fed off); 1851, oats; 1852, clover (mown, and then grazed); 1853, wheat; 1854, beans (manured); 1855, wheat (a heavy crop). It was now time to fallow again, but was sown with barley instead, producing a moderately light crop on one-half of the field, though heavier on the other. This barley stubble we had to commence operations upon, so late in the autumn that no time was possible for cleaning that half of the land which was foul with couch; and the ground ploughed up stiff, and would not be reduced into reasonable tilth. Making haste to overtake the season that had slipped by (for this was at the end of October; whereas the Lois-Weedon law is, "sow in September"), we drilled the seed among large clods, the grains being finally covered with not more than an inch of "mould." On the best of the land, after the most enriching "preparation" crop in a "course," wheat badly got-in forebodes a faminous product; but following barley (after which crop the more precious cereal is considered a lost crop), nobody looked for a yield at all, though certainly the field was ploughed an inch deeper than usual. Throughout the summer the scanty crop struggled undismayed against the couch matting one side of the field, and with infesting wild buttercups and sharp thistles that sprang up everywhere after the hoers with a hydra-like pertinacity of growth. Yet, in spite of all ill circumstance and mischance, the deep culture and pulverization of the intervals, combined with the free play of the winds and sunbeams to invigorate and swell the harvest ears, so that a small rick yielded, at thrashing, an unparalleled measure of grain in proportion to the straw. The yield, though not large, was sufficient to give a good profit per acre when sold at 50s. a quarter. Now, if a crop so put in on such ground, upon a barley stubble—the barley itself grown after wheat, without manure—paid its expenses well, is there not a better chance for the crop now coming up, sown as it was in a well-pulverized moist seed-bed that had been bare-fallowed winter and summer? At any rate, the thickly-tillered plant looks splendidly at present, and will doubtless spindle into waving luxuriance under the feeding influence of the hoe. Here we have wheat after wheat, after barley, after wheat, following beans, *manured:* a long while back to the last manuring; yet the third white-straw crop was profitable, and the rows of a fourth shine green and hopeful, with brown stripes of fertility mouldering their clods between.

Actual experience of only one year's crop, added to the bright prospect for another, may not warrant our advocacy of a revolution in wheat-growing such as our system would prove if largely carried out. We do not venture to recommend any farmer to sow all, or even half, his next year's wheat on this plan; but we do urge all occupiers of suitable soil, and whose agents or landlords are not afraid of "exhaustion," to *try a few acres*, and, our word for it, they will soon be willing to stretch the rows a little further. We are in a position to say "the culture is cheap and easy, for we have performed it two successive years; there will be no loss with the first crop, at any rate, so you need not be fearful; and the reward in many ways is so promising, that the experiment is well worth your trouble, contrivance, and risk."

In perusing the following detailed description of our wheat husbandry, let no one suppose we are presuming to stand between the Rev. Mr. Smith and the readers of his "Word in Season," or that we claim the "originality" of cultivating grain on the stripe system by means of horse-power instead of manual implements. Our method is simply a modification of that originated at Lois-Weedon, and our directions conform to those given in Mr. Smith's publications. Jethro Tull worked the intervals between his wheat-rows with the plough and "hoe-plough;" Mr Smith has progressed very far toward accomplishing his more perfect tillage by horses and traction implements; and we have simply contrived a manner of common ploughing and subsoiling between the wheat triplets, without either injuring the plants or defeating the end in view. And we trust that when the public learn how easily the thing is done, they will no longer hesitate to make trials in every suitable locality.

First, then, we would say, believe in the principle: rely upon the fact that tilling the fallow intervals does really nourish and augment the growth and produce of the wheat. For if uncertain on this point, you are sure to select a field for trial in too high a condition; the result being an early over-luxuriance and final failure of the first year's crop. Land in condition for producing a heavy crop of wheat on the ordinary plan (as, for instance, a bare fallow, a field of roots highly manured, a bean or pea stubble, or a piece of seeds richly dressed with dung or sheep-feeding) is too good to begin upon. Rather choose an oat stubble, perhaps a barley or even a wheat stubble—depending upon the known nature of your soil, and its being in or out of "heart."

Also, make up your mind to sow earlier than you would any other wheat, because there are less than half the common number of rows on an acre; which with the same quantity of seed in each row, makes a very thin seeding, and of course more than double the usual average space between plant and plant—a condition of things likely to end in mildew unless you sow early to prevent it. And besides, the great distances apart promote the stooling or tillering of the plants, the branching of the root, and shooting up of additional stems (which, indeed, forms one of the secrets of a good crop), and you will lose both in quantity and quality of corn unless time be allowed for this process to transpire before the advanced spring. So the preparation must take place very soon after harvest.

Well, the "shack" being eaten off by sheep and pigs, and the stubble (if after a straw crop) carried away, of course you will autumn-clean thoroughly; forking out couch, if the land be only slightly tainted; but, most probably, skimming, cross-cultivating, and raking off weeds and rubbish. Plough say one inch deeper than usual, in order to bring up 100 tons of fresh long-undisturbed subsoil, to supply the crop with mineral nutriment during the first year. Level and pulverize with the harrow and roll; carefully pick all root-weeds; and then comes the drilling. But mind one particular point. "Plough dry and sow wet," as Mr. Smith says: that is, do all your paring and ploughing, or ploughing followed by scuffling, or whatever order of cleaning you adopt, when the land is dry; and wait for rain to make a moist seed-bed, before you harrow fine and drill. Getting-in wheat well is always a great advantage; but is of far more consequence, one would think, when there is no store of manure in the soil to make up for defective tillage, and the preparation and treatment of the earth itself is to be the sole support of the crop. Therefore, be nice about the moisture as well as the fine tilth of the ground into which you deposit the seed; and take especial care to cut-in deeply enough with your drill coulters. A remark as to the desirability of having a fine description of seed ("red") for the sake of a bright silica-shielded straw, unless in a district famous for white wheats without mildew), and the caution of well liming, brining, or dressing with arsenic or vitriol—according to your custom—need not be addressed to men of business.

Now for the sowing. There is to be a stripe of three rows at every five feet; the "spaces" between the rows being 10 inches each (instead of Mr. Smith's "foot"), and the "interval" between the stripes, therefore, 40 inches. You want neither the slow line and dibble, nor a sort of parallel-rule wheel "marker" purposely constructed; for a good 5 or 6-feet corn drill, either with a "steerage," or with a "swing" coulter-bar and a good man for "leader," can accomplish the feat. Arrange four coulters on the drill thus: two at 60 inches apart, and, within these, two more at 40 inches apart; making the distances in this order, 10 inches, 40 inches, and 10 inches. Each outside coulter will make the middle row in a stripe of three; and the inner coulters will sow the rows next the fallow interval, the horses (in length) walking along this space left midway of the drill. When arrived at the end, the drill is to turn short, the outside coulter returning in its own track; and the seed is shut off from the pipe of that outside coulter next the unsown part of the field, so that the outside coulters act alternately as "markers" and sowing-coulters. In this way, the drill marks out its own work, without any difficulty after the first course —which the drill-leader "draws" by simple eyesight. Whatever swervings or bends may occur, the width of the interval to be cultivated is always invariable.

The next year's crop will have to be sown along the intervals between the stubble-strips; and the same mode of drilling will suffice, provided the stubble rows remain visible, at least in some parts of the field. How then, do we manage to autumn-clean the ground?

Having harrowed up the thickest of the stubble (which must be left very short by the reapers), stir the fallow intervals with Bentall's, Coleman's, or some other scarifier set as narrow as required; and harrow them two at a time, by means of two out of a "set" of three harrows—that is, the middle one removed, so as to miss the stubble space. Rolling may be done over the whole surface; or a roller made on purpose, in two short lengths with a space between, may be employed. The stubble being pretty plainly seen, is a sufficient guide-mark for the drillmen, who cannot get far wrong when the first stroke has been taken in the right place, and if the land is in a fine state and dark with moisture. The seed may be harrowed-in with harrows covering all the ground. Should the stubble stripes be peculiarly free of couch, perhaps forking out the tufts may suffice: but we must be prepared for cleansing them when foul; and therefore have contrived how to pare or scarify them without interfering with the drilling. When the drill has begun to work, *follow it* with the broadsharer set only about 22 inches wide—not in the track of the drill, of course; but breaking up the stubble lines between the intervals just sown. We find that this operation does not displace or root-up the seed; and after it any amount of harrowing and rolling, lengthwise and crosswise, may loosen and shake out the root-weeds, without fear for the wheat in tolerably dry weather. Only this must be done before the grains have chitted; or at any rate, before the germs reach the surface.

The quantity of seed per acre depends, like the time of sowing, upon whereabouts you farm: being regulated by the quality of your soil, its altitude and aspect, its tendency as to weeds, its liability to worms and slugs, the peculiarities of your climate, the character of the particular season you may have, even the proximity of your holding to harbours of birds and vermin. What is early in one situation, may not be so in another; what is thin seeding in one neighbourhood, is thought thick in another. As an example, take our own case: November being the great wheat-sowing month with us, our present crop was got in the first week of October. In ordinary husbandry we drill 6 to 10 pecks per acre, the former quantity at the beginning of the season, when every kernel will have a chance; gradually increasing the amount as the period of sowing gets later: at the same time putting in more on poor than on rich land. Mr. Smith tried only 1 peck, but "for safety and the sake of the sample" now uses 2 pecks an acre. Our tillage being less perfect than his, and the plants lying open to greater injury from horses' treading, &c., we deemed it best to drill 3 pecks per acre. This appears but a small quantity; yet Mr. Smith's experience with a thicker seeding has shown that the stalks are too many and weak to bear up their bulky heads erect. And consider, that as the average distance between our rows (taken over the entire field), is 20 inches, we have less than half the number of rows that common 9 inch drilling gives us; and thus our 3 pecks an acre puts as much seed in every single row as about 7 pecks does in plain drilling. In fact, we drill with the same cog-wheel on the cup-barrel for both cases.

When your wheat is well up, and the triple-row emerald stripes are beautiful from end to end, comes the first really Tullian operation, namely, the ploughing along the 40 inch intervals. With a common plough, and horses "in length" (a boy leading the first horse), plough a single furrow down each interval, going say 4 inches deep. Aiming to keep the coulter 6 inches from the wheat-row on his left-hand side, the ploughman has no difficulty in taking his furrow within 4 to 7 inches of the wheat, a latitude of deviation from the true line that must be allowed him; and the upturned slice has just room to fall over, short of the wheat on the opposite side of the interval. Very few clods will be found to roll and bury the young plant.

Break up the bottom of every furrow with a proper subsoil, penetrating 5 or 6 inches, according to the strength of your team. We use Bentall's broad-sharer with the side-beams removed, a 6-inch share on the heel, and subsoil point in front, this going at least 5 inches down with 3 horses. The total depth below the surface is thus 9 or 10 inches. When the same intervals come under operation again (that is, in two years time), we may perhaps work still deeper, and it may be with a double-tined instead of single subsoiler. The horses, of course, are all harnessed in length, walking upon the furrow bottom.

Leave the field thus treated (looking lengthwise like a wheat crop, and cross-wise like a trenched-up fallow, reminding me of those corrugated pictures presenting two views at different angles), and let the frost and snow, wind, rain, and drying sunshine exert their forces upon it. And observe how large an extent of superfices is exposed; for not only can the atmosphere enter 9 inches down into the subsoil, but the furrow-slices thrown up at an angle, almost double the area of surface in the intervals.

In January and February, taking the chance of suitable weather, the same tillage is to be repeated, only on the other side of each interval. The plough turns back the pulverulent furrow-slice of the former operation, covering over the long-exposed broken subsoil in the old furrow, and going 4 inches deep below the surface level, casts up upon the top a new slice of stiff unmellowed soil for the weather to act upon as before. The horses are obliged to walk along the old furrow, treading down the crumbled subsoil; but (as it has become so friable), not inflicting much damage by compression. The newly-opened furrow must be subsoiled as before, and left in this exposed state.

So far, your tillage has provided a supply of more or less pulverized earth 9 or 10 inches in depth, on both sides of every interval, and within a few inches' reach of the wheat rootlets. And if you comprehend Jethro Tull's teaching, you will understand that soil more or less pulverized by atmospheric action must be necessarily more or less "fertilized;" hence, your growing plants will have close at hand a deep store of nutriment on which to feed during the summer. The difference, you perceive, between our method and ordinary subsoiling, lies in the circumstance that every one of the subsoiled furrows remains open and exposed, instead of being immediately buried by a succeeding furrow-slice. And it is not a mere deep stirring without inversion as performed by the tines of a subsoiler or cultivator; neither is it a complete inverting of the staple and subsoil, as in doubble-digging or trench-ploughing, that we practise. But the staple (that is, a 4-inch stratum of it) is inverted, and *removed by the plough off the subsoil that lies beneath*; and the subsoil is then torn to pieces, and submitted to the disintegration of our changeful English weather.

As far as you have proceeded at present, half the land is in undisturbed possession of the wheat rows; and the alternate halves, or intervals, are deep-worked on both sides. But as the plough opens a furrow having only 7 or 8 inches of clear bottom, and the subsoiler breaks horizontally only a few inches further toward the centre of the intervals, there will still be a ridge of unmoved ground along the middle of the interval some 10 inches in width. Therefore, in April or May, break up this, and stir the whole breadth of the interval with any suitable subsoiler or grubber. We use Bentall's implement, the central subsoiler, and two side-tires, without shares; the width altogether being 20 inches. The side wheels are set so as to travel in between the wheat rows, acting at the same time partially as rollers to press in the wheat. The depth worked with three horses on our soil is 5 or 6 inches, which moves the entire breadth of the interval, levelling the high furrow-slice left by the February operation, and mingling and incorporating a considerable portion of the ameliorated subsoil with the upper staple. And in this way, some of the previous surface-mould is replaced by portions of subsoil; and these kept upon the top, and subjected to all the scarifyings and horse-hoeings, the rain, dew, wind, and sun, of a summer and autumnal fallowing, add so much virgin soil to our field, and deepen its productive stratum.

By way of further direction, we scarcely need insist upon the watchful destruction of weeds that thieve the nourishment provided for the crop, or urge the frequent cutting of the incrusting intervals by the sharp-knived horse-hoe, to promote the absorption of the atmospheric gifts, and pulverize a rich surface-bed for the spreading wheat-roots to feed in. And of course, the wise husbandman will time this stimulating operation according to the obvious thriving or lagging growth of the plants, and will narrow the width of the implement as the season advances and the roots extend.

If possible, have the intervals in a state of powder, say by the middle of June: as you should perform another operation when the wheat is in full-ear or going out of bloom, namely, earth-up the wheat rows as you would potatoes, only with care and moderation. This may be done with a ridge or double-mouldboard plough, the horse being driven and guided by a lad walking along the next adjoining interval. Owing to excessive draught, our intervals last summer were too rough and cloddy to admit of this process being done at all; and as the seed had been imperfectly put in the ground, many odd stalks in the outer-rows were dashed down by the July storms, bent an inch or two above ground, and laid prostrate across the intervals. Gathering up these straws made tedious work for the reapers, and the grain in them was also light. Earthing-up slightly, Mr. Smith finds, will prevent this, without injury or retarding the ripening of the corn. But the stems are stronger than in a common crop, and though liable to twisting and whipping by the winds, are rarely found to lodge.

You will probably be puzzled about the best way of harvesting: the three-row strips being too narrow for mowing, and if reaped, the stubble when afterwards mown, would be only scattered and dispersed by the scythe. We paid our men extra to reap with hooks or sickles rather close to the ground, and collect the many stalks that lay athwart the intervals; and they had to leave separate "reaps" or handfulls along each stripe to be afterwards gathered into sheaves.

The subjoined items of expenditure on our 10-acre crop will give an idea of the cost of the operations now described. Manual-labour is charged at the price paid for it; and horse-labour at half-a-crown a day for each horse. The expenses, divided by 10, give *per acre* as follows:

		S.	D.
Scarifying, cleaning, drilling, &c.		16	0
Seed, 3 pecks (at 56s.)		5	3
Bird-keeping		0	4
First ploughing and subsoiling		3	8
Second ditto		3	6
Hand-hoeing wheat..................		1	10
Scarifying intervals..................		1	10
Hoe-weeding by hand................		8	4
First horse-hoeing intervals		0	9
Second ditto......................		0	10
Reaping		13	0
Surveying reaper's work............		0	3
Carrying, &c.		1	11
Thrashing and dressing		8	1
Delivering at market		1	9
Total working expenses	£8	2	6

To which, of course, are added the rent, tithe, rates, taxes, and interest on outlay. And this is the cost of *growing an acre of wheat, and at the same time fallowing that acre for next year's crop.*

It now remains for us, in concluding this series of papers, to urge the experiment upon all who are desirous of growing wheat at a profit, in spite of low prices. And should our second harvest corroborate the assurance of the first, we shall be able to enforce the adoption of the system on the largest scale.

AERATION OF LAND.

Whatever be the elements of the atmosphere by which the earth may be acted upon, it is certain that the soil, if freely exposed to such elements as present themselves in the ordinary state of the atmosphere, has its fertility greatly increased.

It signifies nothing what are the required elements, unless it be capable of demonstration that it is solely owing to some particular elements, and that those particular elements can be supplied to the soil at a cheaper rate by other means than by exposure.

To effect this exposure, it has been usual to have frequent ploughing, fallowing, drilling, &c, which conduced to this purpose, and were otherwise useful by destroying weeds; but I venture to suggest the following plan, not as a substitute for the ordinary means, but as an *accompanying measure*, which is small in first cost, and in its action attended with little expense:

Let drainage-tiles (perforated, if needful) be laid as usual; but let all the drains in a field be connected. At the lower end of the field, where the drainage is discharged, let the ends of the pipes (not perforated) be well packed in clay, and the ends of the pipes made like an inverted syphon, so that drainage-water will lodge *in the bend*. In various parts of the field—or one part, if that be found sufficient—let there be large bell-mouthed funnels to gather wind, so arranged, by means of a vane, as always to present the open mouths to the wind; and let these funnels be connected by an upright pipe with the drains.

The pressure of the wind in the mouth of a funnel will cause an equal pressure through all the drains, it not being able to escape through the ends, because of the water lodged in the bend; and air will, consequently, permeate the soil at all times when there is a breeze.

It might in some situations be possible to use water-power, or even steam-power, for an occasional service, as many well-drained farms now-a-days are furnished with steam-engines, and the aëration through the ordinary drain-pipes would be effective.

In steam-packets a long bag opened to the wind at the side, near the top, forces air into the hold amongst the cattle. Gas companies find that their gas permeates in large quantities through the soil, although their pipes are as tight as they can make them, and the ground they are laid in dense; whereas, in the plan suggested, the pressure would be in perforated pipes, and through a loose soil.

The plan would not interfere with the drainage, but would be a second use for the same pipes, and be stimulating the crops at periods when it would be otherwise impracticable to manure them.

G. H. B.

THE IMPORTATIONS OF FOOD IN THE LAST TWENTY YEARS.

An official return has lately been laid before Parliament of the quantities of articles of food imported from abroad in the last twenty years, of the same kind as those produced at home, upon which Customs duties are still levied; and as the subject is necessarily interesting to our agriculturists—few of whom will see the document—we will run over the details, to see what quantities of articles we import of a like character to those produced at home.

This parliamentary return does not include live animals, salted provisions, potatoes, fish, and such-like articles, which come in duty free, but is restricted to the chargeable articles, which bring in, on the average, a net Customs revenue of about £750,000.

The imported food may be ranged under three or four groups, as grain and meal, fruits (raw and dried), dairy and farm products, beverages or substances used in their preparation, and a few minor items.

First, then, we have grain, the imports of which have necessarily fluctuated largely in the series of years under consideration, consequent upon the vicissitudes of seasons and the variable demand for food supplies, according to the nature of our own and the European harvests. Thus, while in 1836 we imported but 168,647 quarters of foreign wheat, in 1853 we received nearly 5,000,000 quarters; and the average importation of wheat in the last ten years has been 3,500,000 quarters. To this has to be added the wheat flour, and other grain and meal.

During the last ten years our annual imports of wheat and flour have amounted, on the average, to 5,000,000 quarters; a very considerable part of which has been derived from Russia and countries situated in the Baltic, Turkey and Egypt, the United States, and Canada.

Our supplies of foreign wheat-meal or flour, which from 1839 to 1845 scarcely averaged 1,000,000 cwt. per annum, have since averaged about 4,000,000 cwt.; although last year there was a decline of nearly 2,000,000 cwt. as compared with the previous year's imports.

Of Indian corn or maize, the imports may now be taken at an average of 1,250,000 quarters per annum unground; and a yearly decreasing quantity of the meal—in 1836, 4,000,000 cwt. Compared with the enormous imports to supply the Irish famine-wants in 1847 and 1848, the present imports look very insignificant. For bread or human food in any shape Indian cornmeal will, however, never make any headway in this country; the colour and flavour being repugnant to the popular taste, which demands wheaten bread as its mainstay, whatever be the price. The consumption of maize here is, therefore, chiefly as food for live stock and the manufacture of starch.

The imports of foreign barley fluctuate considerably, ranging from only 100,000 qrs. in one year up to nearly one and three-quarter millions last year. The imports of barley meal are trivial, amounting to a few tons; but it seems strange why the 50 or 60 tons of pearl barley could not be made at home. About 1,000 or 2,000 quarters of bere or bigg come in annually.

Of oats, our average imports of late years have been about 1,000,000 quarters, although last year it reached 1,710,300 quarters. Of oatmeal, we seem to draw larger quantities from abroad; the imports averaging 1,000,000 qrs. Our foreign supplies of rye are very uncertain: in some years we have imported 100,000 or 200,000 quarters; in others the supplies are small, amounting to but 1,000 or 2,000 quarters; in 1856, we imported 28,000 quarters. The figures for last year are not yet made up. About 7,700 cwt. of rye meal were also imported in 1856.

Of the pulses our foreign imports do not vary much, at least of late years; about 100,000 quarters of peas and 350,000 quarters of beans are near the average.

Grain pays the duty of 1s. a quarter, and meal 4½d. per cwt.

There are a few miscellaneous preparations of grains and seeds which may be mentioned. Firstly, an increasing supply of semolina—a preparation from the wheat of the southern parts of Europe. The best is the fine hard parts of the grain, rounded by attrition in the mill-stones, and made chiefly in Italy. We imported 1,300 cwt. in 1856. In France, however, this name is given to the large hard grains of wheat retained in the bolting machine after the fine parts have been passed through its meshes, and with this, when ground, the fine white Parisian bread is made. Of vermicelli and maccaroni, other Italian preparations of wheat, we import about 5,000 cwts., subject to a duty of 1s. the cwt. An article termed "manna croup," comes in in small quantities. In 1853, 1,467 cwts. were imported; and in 1856, 453 cwts. were received. Properly this name is applied to the seed of the wild grass *Glyceria fluitans*, a very nutritious grain, collected in streams in northern latitudes, and much used in soups, or for porridge in Germany, Poland, and Russia; but that which we import is exclusively a preparation from wheat, passing under the name and competing with semolina. What the "mixed mustard" (which comes in to the extent of 150 cwt.) is, we scarcely know. It is not mustard-flour, for there is a separate heading for that in the return, and our home growth of mustard seems fully adequate for the supply: it cannot be French vinegar-mustard to this amount, and therefore it is probably adulterated mustard-flour, rated at 5s. the cwt. against 1s. 6d. the cwt. duty on pure mustard-flour.

Besides the foregoing enumerated articles, we received 35,300 cwts. of biscuit and bread in 1856.

The imports of foreign butter continue steadily to increase, but this supply would go a very small way towards buttering the bread eaten by our population, to say nothing of the other culinary uses of butter. Our imports of butter last year amounted to 442,837 cwts., and of cheese 394,749 cwts.; but we managed to export of these two dairy products 111,008 cwts. of butter, and 28,000 cwt. of cheese; so that with our own dairy produce we could do pretty well even independent of Dutch butter or American and Dutch cheese. Eggs, however, still form a large and increasing item of import, and for these there is an enormous home consumption. An increased supply of ten or twelve millions a-year of French eggs comes in usefully for the necessities of the cook and the manufacturer, there being a large demand in many trades for eggs, exclusive of our food wants. Last year the imports reached 127 millions!

Of beverages, and substances used in making them, we imported in 1856, 11,500 gallons of beer, and at duty of £1 the barrel of 36 gallons.

The quantity of foreign hops received varies. In 1854 we imported 119,040 cwt.; but since the duty has been raised to £2 5s. the cwt. the quantity has declined, the imports last year being 18,712 cwts. The average annual imports of hops the last three years have been 19,720 cwt.

A fair amount of roasted chicory still comes in, our receipts from the continent in 1856 having been 24,000lbs.—very greatly below, however, the large imports in 1853 of 134,644lbs. The principle of admixture with coffee seems to be largely checked by the Excise regulations, which compel the sale of chicory in separate packets or labelled as a mixture. Whether the home growth of the root has been interfered with, we do not know.

There is an enormous import of carrawayseeds, which reached 12,485 cwt. in 1856, paying a duty of 5s. the cwt. One would scarcely suppose that, besides the home growth, there should be so large a demand for this aromatic seed for confectionary purposes, pharmacy, and making an essential oil.

There is a large amount of fruit of various kinds received from the continent and elsewhere, owing to our variable climate being less certain and favourable for the early production and ripening of many kinds. Thus pears, apples, and cherries come in in considerable quantities. For instance, in 1856, we received 531,291 bush. of apples, 22,532 bush. of pears, 17,651 bush. of cherries, small quantities of medlars, quinces, &c., besides 97,000 bush. of unenumerated fruits. In addition to these, there were 2,364 casks of dried apples, 32,642 cwt. of dried plums, small quantities of dried cherries, pears, &c., and 56,534 bush. of walnuts; 127,000 bush. of onions may perhaps be included in this class. These, with some vinegar, pickles, and sauces, make up the category of duty-paid articles competing with home-grown produce.

There are, as we have before remarked, some few other important food-products entering duty-free, such as animals, salted provisions, and potatoes. Thus last year we received 606,606 cwt. of salted meat, bacon, and hams, 182,860 cwt. of lard, 955,057 cwt. of potatoes, and 281,000 living animals for food.

But how trivial would these be, towards our home demand! And against these foreign imports we have also to set off the large exports of home produce of agricultural origin. For instance, last year we shipped 435,000 barrels of beer and ale, 110,008 cwt. butter, 28,000 cwt. cheese, 4,821,277 gallons of British spirits, and pickles and sauces of the value of £355,496—making up for these few enumerated articles a total declared value of nearly £3,500,000, besides many others of smaller gross amounts. Judging from the average of years, our food exports may be taken at fully £5,000,000 in value.

REVIEW.

THE EVIL RESULTS OF OVER-FEEDING CATTLE.—A NEW INQUIRY.

By F. J. Gant.—Churchill.

It is now just about twelve months since that we had to call attention to a rather remarkable pamphlet on the meat trade of the metropolis. The author of this, Mr. Gamgee, showed that, despite our amended regulations and improvements, the traffic in diseased flesh was of itself a regular business. He found sick animals openly offered for sale even in the new market at Islington; while he traced their carcases to Newgate, Leadenhall, and other public resorts. Whatever people might think of it, there was really no mistake about the fact. The lower classes, most likely, were the chief sufferers. Indeed, Mr. Gamgee's argument went to this. Meat unfit for human food was bought and sold clearly on the understanding that it was to be had cheap. Perhaps we were all very sorry for "the poor people," and there was an end of the matter. We certainly never heard that anything more came of it.

The story, however, is hardly told out yet. It may be brought a little closer home to us all. Another member of Mr. Gamgee's profession—another medical man, that is—has also been pursuing his scientific researches, and with this result — that what we consider the *best* meat, he considers is the least fit for consumption! Mr. Frederick James Gant, surgeon and pathological anatomist to the Royal Free Hospital, went, like all the rest of London, to the last Christmas Fat Cattle Show, at the Baker-street Bazaar. His "limited opportunity for examining them" still enabled him to detect—as he says—a number of diseased beasts, sheep, and pigs. What mostly struck Mr. Gant, at the outset, was what has no doubt taken the attention of almost everybody else. It was, in his own Italics, "*the size of the animals compared with their respective ages.*" Precisely so. One of the chief objects of breeders, and particularly of such societies as the Smithfield Club, is early maturity. That is to say, we get a beast, bigger and better, at half the expense in time and capital, you would have done with the old unimproved races. There is hardly such a thing, now, even as old mutton. But Mr. Gant looks at this in a very different light, and is by no means willing to join in the self-gratulation with which we have been greeting each other:—

> "When I contrasted the enormous bulk of each animal with the short period in which so much fat or flesh had been produced, I naturally indulged in a physiological reflection on the high-pressure work against time which certain vital internal organs, as the stomach, liver, heart, and lungs, must have undergone at a very early age. Now with the best method of rearing cattle, or that which is most conducive to their health, the medical profession are only indirectly concerned; but of the *dietetic value* of animals so reared for food, the profession are, or should be, the immediate overseers and arbitrators."

In accordance with this conclusion, Mr. Gant follows up many of these animals to their last homes, and, thanks to the courtesy of Messrs. Jeffery, King, Gorton, Sack, Sinkler, and others, sees most of them slaughtered. Alas! the prime joints and noble carcases these liberal buyers pride themselves so much on, would seem to be little better than a delusion and a snare. Those fine ribbons, Christmas favours, and first-prize decrees, proclaim to science but little more than that such meat is not fit to be eaten. The more distinguished they appear to have been in the Show-yard, proportionately the worse do the animals turn out in the slaughter-house.

In a series of really beautifully got-up plates, the first we come to is a coloured illustration of "a diseased heart of a sheep by conversion into fat." This is found to be a GOLD MEDAL sheep, one from a pen of fat wethers, the best of all the Short-woolled—his Grace the Duke of Richmond exhibitor and breeder. Then we have depicted the diseased lungs of a sheep, one of the best of all the Long-wools—Lord Berners exhibitor and breeder. On the same page is the portrait of a diseased or unhealthy mutton-chop, from the loin of the gold-medal Southdown. Further on we turn to "the diseased heart of a Devon heifer, by conversion into fat"—his Royal Highness the Prince Consort exhibitor and breeder. There is only one grand moral example wanting, and that forms the illustration of a whole page—"the diseased heart by conversion into fat," of the gold-medal Short-horn—Mr. E. Wortley exhibitor and breeder. There is no mistake, no shy fighting here. In the first place, you are shown the heart of an animal in the healthy state it should be, and then that of one diseased by over-feeding. Let Mr. Gant's text speak further to this. He is now going the round of the yard:—

> "My limited opportunity for examining them enabled me to detect no external sign of disease, except in two Devon cows, Class IV., Nos. 32 and 33, prize £5, each of which was suffering from *prolapsus vaginæ*. One of them looked very ill, and laid her head and neck flat on the ground, like a greyhound. I pointed out these animals to a man who was drawing water, and I asked him if their condition was one of common occurrence. He said, 'I knows nothing of them beasties in p'ticler, but it's the case with many on 'em, I knows that.' I passed on to the pigs. A pen of three pigs, belonging to His Royal Highness the Prince Consort, happened to be placed in a favourable light for observation, and I particularly noticed their condition. They lay helplessly on their sides, with their noses propped up against each other's backs, as if endeavouring to breathe more easily; but their respiration was loud, suffocating, and at long intervals. Then you heard a short, catching snore, which shook the whole body of the animal, and passed with the motion of a wave over its fat surface, which, moreover, felt cold. I thought how much the heart, under such circumstances, must be labouring to propel the blood through the lungs, and throughout the body. The gold medal pigs of Mr. Morland were in a similar condition, if anything, worse; for they snored and *gasped* for breath, their mouths being opened, as well as their nostrils dilated, at each inspiration; yet these animals, only twelve months and ten days old, were marked '*improved* Chilton breed.' They, with their fellows just mentioned, of eleven months and twenty-three days, had early come to grief. Three pigs of the black breed were in a similar state at seven months, three weeks, and five days; yet such animals 'the judges highly commend.'"

This is very graphic, and almost amusing in its tone, were not the injury said to be of so serious a character. We shall not follow our author into the dissecting-room, of his labours, in which he gives further and yet more useful illustration. We must be content, the rather, with the chief result and its consequences:—

> "Under the present system of rearing and feeding, one disease is of most frequent occurrence, namely, conversion of the heart into fat. I am supported in this opinion by the invaluable testimony of Professor Quekett, of the Royal College of Surgeons, who re examined the hearts in question, and confirmed my observations."

The consequences are—

> "That in over-fed, corpulent animals of forced growth, the muscular substance of the most vital organ, the *heart*, is pallid, soft, and greasy; and that its fibres then contain fat instead of the fibrillæ, in which reside both the contractile power of muscle, and its nutritive value for human food. We therefore say that such meat no longer retains its healthy structure and nutritive quality, although when degenerated into fat, it may still present the semblance of ordinary muscle, and thereby deceive both buyer and seller. We should therefore expect in vain to replenish our own muscles by the use of such food, nor should animals thus over-fed be regarded as prize specimens of rearing and feeding. The heart, being converted into fat, no longer retains its contractile power, but beats feebly and irregularly. The blood, therefore, now moves onward in a slow and feeble current. Hence the panting breathlessness due to stagnation of blood in the lungs, which the heart labours (in vain) to remove, while the skin and extremities are cold. Hence the stupid, heavy-headed expression of a congested brain, and the *blood-stained* appearance of meat after death. The slightest exertion to an animal, under such circumstances, might suddenly prove fatal. Were a man, in this condition, to present himself at an insurance office, it would refuse to insure his life at any premium. *Yet, under similar circumstances, a sheep is awarded gold and silver medals, and its feeder a prize of £20!!*"

Mr. Gant's remedy—for we prefer that he should speak for himself—is:—

> "Instead of pursuing the present system of rearing cattle, much as it may test the qualities of food, and other matters of minor importance, let breeders, feeders, exhibitors, and prize judges alike visit the slaughter-houses; let them do this with a due knowledge of diseased appearances, and let them thus discover that system of rearing which is most compatible with the health of cattle, and which produces the largest amount of the most nutritious food for man. Under the present system the public have no guarantee, and are not insured the best, if indeed the cheapest food. The bulky withers of a fat bullock are no criterion of health, and its flat tubular back may conceal the revolting ravages of disease."

If we recollect aright, in the early days of the Smithfield Club this was done. The judges inspected the carcases of the animals after they were killed, and revised or confirmed their decisions accordingly. As the Society increased in influence and numbers, no doubt the practice was found inconvenient, if not altogether impracticable. Still, the fact that this has been done gives weight to the suggestion, and shows that Mr. Gant asks nothing but what the Club itself has already some precedent for. His pamphlet, originally the subject of a communication to the *Observer* newspaper, is called "EVIL RESULTS OF OVER-FEEDING CATTLE—A NEW INQUIRY," and is dedicated to the agriculturists of Great Britain and Ireland. However sound or unsound his deductions may be, we must do Mr. Gant the justice to say that he has spared no trouble nor expense in perfecting his work. The plates alone must have been very costly, and for the original of one—the diseased heart of the Shorthorn—he paid no less than half-a-guinea!

There is one reflection forces itself upon us here. If animals intended for the butcher are really in this diseased condition, what evils must follow from breeding-stock being almost equally over-fed? And yet our experience of only last summer recals pigs and sheep in this panting, helpless state; while one of the prize fat cows at this very Christmas Show was sent home again in calf! To us it is very satisfactory to feel, that of this branch of the evil we have long continued to complain.

WOOL AND WOOLLENS.—IMPORT AND EXPORT.

Incidental mention was made by Mr. Ashworth, in a paper on cotton read at a recent meeting of the Society of Arts, of the Increased Production of British Wool, and he inferred that the increased consumption and enhanced prices were mainly due to the introduction of an admixture of cotton with wool in various fabrics; "the attractions of the article manufactured, together with its comparative cheapness," according to his dictum, having called for more wool, and, with this increased demand, led to a greatly-improved price.

Now, we are not prepared to admit to the full the reason so plausibly assigned by the cotton advocate, nor to place very great reliance on his statistics regarding wool. He states the British wool grown in 1857 at 143,042,782 lbs. at 19d. a lb., which gives a value of £11,322,219. That grown in 1835 he fixes at 108,000,000 lbs. at 13½d. a pound, making an aggregate of £6,075,000. This change in the manufacture from pure woollens to mixed wool and cotton fabrics, he tells us, has been attended with an unexpected gain to the British wool-growers, by an increase of trade and higher price amounting to 5¼ millions sterling. The same increase of prosperity, and to a large extent (Mr. Ashworth adds), has been shared by the sheep-farmers of Ireland; but the accounts are not clear, in consequence of large quantities of Irish wool having been sold for shipment to France, Belgium, and Germany."

Now, however well read he may be in the history and statistics of the cotton trade and cotton manufactures of the country, we fear Mr. Ashworth's views and figures respecting wool and woollens are less to be relied on; and we must, therefore, join issue with him on several points.

France we know to be, like ourselves, a large importer of foreign wool; but we are not aware that she seeks specially that of Irish origin, and we doubt whether the Irish wools do not, for the most part, go to Liverpool, and, through the public wool sales there, enter largely into the British manufactures. From 3,000 to 4,000 bales of Irish wool, we know, reach Liverpool annually, the average import of the last six years being 3,800 bales.

French buyers no doubt appear at our London sales, as do purchasers from other parts of the Continent. We have not the latest figures of the imports of wool into France, but in 1853 France imported 48,400,000lbs. of wool. She has of late years been paying increased attention to sheep-culture in Algeria, where there are now about eight millions sheep, and about sixteen million pounds of wool are produced there.

We next join issue upon the quantity of sheep in the kingdom, and the British wool produced; and here we certainly enter upon very debatable ground. Unfortunately we have no return of the number of sheep kept in Great Britain. Mr. Braithwaite Poole, in 1853, estimated the total annual growth or produce of wool in Great Britain and Ireland at 32,000,000 fleeces, averaging 4 lbs. each; and taking the wool to be worth 1s. a pound, this would give a total value of nearly £6,500,000. In the official British catalogue of the Paris Exhibition (1855), the estimated annual produce of wool in the United Kingdom is stated to be about 130,000,000 lbs.

It is easy to assume figures; but estimates necessarily differ; and we would refer to Mr. McQueen's Statistics of the British Empire (p. 21)—no mean authority —who estimated the production of British wool in 1835 at 246,700,000 lbs., valued at £13,979,166, and the foreign wool then imported at 46,500,000 lbs., valued at £3,750,000. If the number of sheep were then 48,000,000 in the kingdom, although this may have been too high an estimate, they must in twenty years have somewhat increased. We know, by the agricultural returns, there are in Ireland and Scotland at the present time about 9,000,000 sheep, and in England and Wales there cannot be less than 40,000,000; and at 5 lbs. per head all round, the wool produce of the United Kingdom would be 245,000,000 lbs.—no increase, after all, upon Mr. McQueen's estimate.

But, then, these assumptions depend upon very uncertain data, owing to the absence of precise returns of the sheep in England, and the different average weight of the fleece, which would not perhaps equal 5 lbs. per sheep all round, now that short-woolled sheep are more general than they were in former years, and making allowance for lambs.

We now receive much larger supplies of foreign and colonial wool than formerly, our imports having nearly trebled in twenty years, reaching in 1857 to 129½ million pounds. And our shipments of woollen yarn and fabrics to foreign states and our colonies are also on a largely increased scale, owing to the increase of wealth and population. While in 1835 our woollen manufactures and yarn exported were only valued at £7,000,000, in 1857 they reached £13,647,186.

But this was by no means owing to the extraordinary ability or skill of the cotton manufacturers; for only £2,000,000 in value of the exports came under the denomination of "mixed fabrics," and the home consumption of these mixed cottons and woollen goods was certainly not so large as that.

We cannot pass over, in our consideration of British wool, the increase in our Colonial production. Australia and New Zealand, the Cape Colony, British India, and Canada have largely increased their number of sheep, and their yield of wool. In Australia, in the two principal colonies, we find, in 1855, Victoria had 5,322,000 sheep, and clipped 22,353,000 lbs. wool; New South Wales, 8,144,000 sheep, and clipped 17,671,000 lbs. wool.

The apparent anomaly in these figures is attributed to two causes: the lighter fleece of the old colony, and the fact that Port Phillip is of more convenient access to the south-western district of New South Wales than Sydney, and therefore receives the pastoral produce of that locality.

But the considerable trade of those parts of New South Wales and of the adjacent portion of Victoria is now vigorously contested by a third party, the colonists of South Australia, who have already navigated the river Murray as far as Albury, and conveyed the wool by steamers and barges to the shipping port of their own colony. The wool produced on extended pasture runs in the northern runs of Australia, now that the Moreton Bay district is to be formed into a separate colony, will no longer swell the returns of Sydney.

The export of wool from Port Phillip has slowly increased in spite of the attractions of the gold diggings. Only one year was it beaten back (1851) as will be seen from the following table:

YEARLY EXPORT OF WOOL FROM VICTORIA BEFORE AND AFTER THE GOLD DISCOVERY.

Years.	Wool, in lbs.	Years.	Wool, in lbs.
1846	6,406,950	1851	16,345.000
1847	10,210,030	1852	20,247,000
1848	10,554,663	1853	20,843,000
1849	14,567,005	1854	22,998,000
1850	18,091,000	1855	22,353,000

The imports from the Australian colonies last year fell back to about the produce of 1855, being 49,000,000lbs., having in 1856 exceeded 52,000,000lbs.

Various inducing causes, other than the trivial reason assigned by Mr. Ashworth, must be looked to as having stimulated the production of British wool at home and abroad. The tide of emigration; new and extended pasture land in Australia, New Zealand, and Southern Africa; the progress of settlement in Canada; the extension of trade with Central Asia (our imports from India having risen to upwards of 19 millions); the diffusion of wealth owing to the gold discoveries and increased commerce, and the greater attention paid to sheep culture, owing to the demand for food—all these and other reasons might be much more truly assigned for the existing prosperity and enhanced demand.

SPRING PROSPECTS.

The past season has been a trying and an eventful one to most farmers. We were comforting ourselves with ideas of permanent prosperity, and cosingly imagining ourselves snugly reposing in the warm nest which the past two or three years of "good times" had enabled us to build, when suddenly a storm arose—a tornado in the commercial world, and crash after crash gave ominous sounds and unmistakable warnings. Soon the flourishing tree upon which our hopes depended was shaken to its very roots, its leaves shed all driven and gone, and its branches were broken and scattered by the storm. Such was the sudden and unexpected turn of affairs in the agricultural world consequent upon the shock to commercial credit. It was incredible; at first, few would be induced to believe it. Failure succeeded failure in rapid succession, and at length the general body of farmers were convinced that, for the present at least, their prosperity had waned. A reaction was the result, and needless alarm at once took the place of incredulity: hence the farmers began to pour supplies upon the markets, and an unusual and unwarranted depression in prices has been the consequence. Now my object in this short paper is to try and stem this downward course, and bid my brother farmers take courage. The worst is over; be patient: signs of renewed activity in the commercial and manufacturing departments of our country's industry appear, and serve to show that speedily you will feel the benefit of an increased demand for your indispensable products. The trial has been a severe one; but I trust it has passed or is fast passing away, without leaving distressing evidence of its effects; and, in reliance upon the energy, the enterprise, and the vast resources of our astonishing country, I would urge a renewal of every effort, as farmers, and the adoption and practice of those safe and salutary improvements which modern agriculture has developed and confirmed. Our mainstay and safety is in the improved practice of agriculture, so that, "come what may," we can face the world's markets, and no longer entertain such dread of foreign competition. But to my text: "Spring Prospects"—the crops.

The Wheat Crop.—There probably never was a winter better adapted to uphold the security of the wheat plant than the past. Throughout the whole season scarcely any damage has been sustained, and the fullest and most healthy plant ever known has been the result upon the average of the country; indeed, but few districts have a thin plant. In fact, the plant is too full—too much crowded, if anything, to be more than usually prosperous; a fault, if it be one, not to be greatly deplored: we have often to complain of thinness of plant, and but seldom the contrary. The wheat crop, then, has an abundant plant; and we have every evidence of its favourable progression. The season for rolling or compression has been most favourable, and a good firm seed-bed has been obtained, which is universally known to be so conducive to the safe growth and prosperity of the seed-crop. There has also been a sufficiency of cold and frosty weather to keep the plant in check, so that scarcely any crops have become winter-proud. Should the season continue favourable, we anticipate an early harvest and a good crop.

The Spring Crops.—*Beans, Peas, Barley, and Oats.*—These have all been put in under the most favourable circumstances. The soil is in the finest state imaginable to receive the seed; they have been early sown, and every good grain may and must grow; indeed, in the majority of cases, the plant has made its appearance, and looks remarkably well. The bean and peas seed lay a somewhat prolonged time in the ground, but came up safe and healthy-looking. We cannot, under such favourable auspices, avoid coming to the conclusion that the prospects of our spring cropping are also remarkably good. The land being in fine condition, we anticipate a rapid and full growth, the oats most probably requiring, on the best land, topping to retard their progress.

Potatoes.—The season for making preparation for this crop has been all that could be desired. The soil is in a finely pulverized state, and the crop is for the most part planted under every condition advantageous to its growth. A large breadth, too, has been got in, and being thus early, we augur a greater freedom from disease, and a corresponding yield of marketable tubers, the earlier settings generally producing the greater quantity of large potatoes. We should greatly rejoice to find that this unusually mild winter has tended to put an end to the mysterious scourge we call "potato disease;" it would indeed be a blessing most worthy of a nation's gratitude.

The Root Crops.—We never knew farm work in such a forward state: great progress has been made in fallowing and preparing the land for the root crops; a fine tilth has in innumerable cases been already obtained: the fear is that continuous rains may set in, and prevent the completion of the fallow: so far everything has been favourable. Much land is in preparation for the mangold wurzel crop. This crop continues to obtain greater favour with the agricultural public, and its culture is widely extending. We are heartily glad it is so. It is an invaluable crop, and ought to be grown by every farmer who has stock to keep. The culture, management, storing, and mode of consuming it *is now so* patent, that every one may adopt it as a farm crop with advantage.

The Grazing Department.—The grass-lands as a whole do not correspond with the favourable state of the arable-lands. The absence of snow, "the poor man's manure," during the winter, is and will be felt. About a month since they looked sadly, being brown and very bare of grass. In the past week or two they have recovered their greenness, but are slowly progressing, and will not be ready for the early stocking we were looking forward to. This will be severely felt, as the winter keeping (mangolds excepted) has for the most part long been finished, and much difficulty is experienced by flock-masters in providing for their flocks; this has led to many forced sales, causing, a few weeks since, a great depression in store stock. This, however, has been recovered, and this kind of stock is now selling at a remunerative price to the breeder, but at a rate not likely to leave a fair margin of profit to the grazier. Fears are also entertained relative to the healthy state of the flocks, owing to the very inferior quality of the winter food they have been compelled to subsist upon. This, I trust, is in a great measure unfounded, as the general resort to corn, cake, and other artificial condiments would keep them in condition, and prevent the injurious consequences arising from unwholesome food. The number of sheep to be brought forward will undoubtedly be considerable, as, owing to the fineness of the winter, the casualties have not been very great. The only danger is from the unwholesome character of the turnip and coleseed crops upon which they were fed, and consequently the absence of condition requisite to being put to good grass: nearly all of these crops suffered from mildew. From this cause also we anticipate a falling off in the condition of the cattle brought forward. It is true, abundance of cake may, in a great measure, compensate for the absence of quality in the turnip; but this abundance will not in all cases be given. Many yards of cattle will come out in their usual splendid state, the pride of their exhibitors, fit either for the butcher or for further grazing; but this class of animals will form the exception, not the rule, this year. Nothing, upon the general average, will compensate for a defective turnip crop: it must be felt in the summer's grazing. I therefore anticipate a short supply of well-fed animals, both in cattle and sheep, for the grazing department, and consequently a scanty supply of marketable meat for the first summer months; this generally leads to many animals being sent to market before they are properly fatted, which tends strongly to depreciate prices. One word relative to pork. The supply of good store pigs has greatly increased; and as these are fatted as porkers, the tendency will be to produce a greater reduction in the price of meat; even at present, pork does not retain its relative value in the markets.—I am well aware these remarks are not of much worth; but I am desirous to provoke inquiry, therefore they are meant to be more suggestive than dogmatic.

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE USE OF GUANO FOR ROOT CROPS.

The ordinary monthly meeting for discussion took place on Monday evening, April 5, at the Club-house, Blackfriars.

Mr. Owen, of Clapton, as Chairman for the Year, presided. In consequence of the meeting falling on Easter Monday, the attendance was not large, but it included Messrs. R. Baker, H. Trethewy, John Thomas, T. W. Granger, C. T. James, L. A. Coussmaker, W. Gray, T. F. Wilson, J. Wood, J. C. Nesbit, T. Hatfield, T. B. Chapman, James Thomas, E. Purser, J. Howard, J. G. King, J. Cressingham, J. Wood (Croydon), T. Congreve, S. Skelton, H. Owen, G. S. Harrison, R. Marsh, W. W. Good, Owen, jun, &c, &c.

The subject for discussion assigned for introduction to Mr. W. Sainsbury, of Manor House, West Lavington, Wiltshire, was thus stated on the card: "The Advantage of Guano for Root Crops, and the Best System of Applying it without Injury to the Germination of Seed."

The CHAIRMAN, in opening the proceedings, observed, that the best method of growing roots must always be an interesting subject to the farmer; and, knowing how great Mr. Sainsbury's experience was in reference to it, he was quite sure that gentleman would treat the topic in an interesting manner. He was sorry that at the present moment the article of guano bore such a very high price in the market; but he had no doubt that Mr. Sainsbury would show that even with that price the use of guano was attended with great advantage; while, on the other hand, as it was a most valuable manure, he trusted the day would soon arrive when it would be obtainable at a far lower rate.

MR SAINSBURY said: Mr. Chairman and Gentlemen, the subject for discussion this evening is one, I think, of the greatest importance to the farmers of this country. The value of guano has been tested by many practical men, by a comparison of it with a variety of artificial manures. I have myself taken much care to give the thing a fair trial. I well know how cautious I ought to be, in stating the result of my experience, and I have no doubt there are many practical men present who are much more capable than I am of explaining in detail experiments in relation to this subject. I do not presume to teach, or dictate in any way; I only wish to give an exact statement of what has taken place on the farm in my occupation, with different manures in competition with guano; and I regret that the subject has not fallen, for its treatment, into the hands of some member of this club who is more competent to expatiate on it than myself. I consider that by increasing the weight of roots per acre, we secure the means of keeping more stock, thereby laying a foundation for good farming. (Hear, hear) It is my intention to state, on this occasion, the result of three years' experience respecting the different kinds of artificial manures which I have used in competition with Peruvian guano at the same expense per acre. In 1855 I was induced to use as an experiment four different kinds of manures for Swede turnips, three of which I purchased from three eminent manufacturers of turnip manures. I shall classify them as No. 1, No. 2, and No. 3. They were all drilled at the same time, with Swede seed, and at the same expense per acre, in competition with guano. The swedes drilled with the three first-named came up, and made equal progress up to the time of the first hoeing; the guano swedes, when they made their first appearance, looked stunted in their growth, and anything but promising, and were much more injured comparatively by the turnip-fly, than those drilled with the three other manures. They were not ready for hoeing for at least one week after the three first-named, which I attribute to the seed not having come in contact with the guano, as a preventive from injury to the germination of the seed. The result was that in the month of August, the progress made by the swedes with all four manures, was about equal in appearance; in the latter part of November, No. 1 and No. 2 swedes were about equal in weight; No. 3 were not so good; but the guano swedes were about three tons per acre more in weight. In 1856, in order to test the relative merits of Peruvian guano as compared with bones, a friend of mine drilled sixteen bushels of bones per acre and I two cwt. of guano, the land being about the same in quality. In the latter part of November the guano swedes were full three tons per acre more than those drilled with bones. In 1857 I wished again to try the relative merits of the same (Nos. 1, 2, and 3, and guano) at an equal expense per acre. All these manures were then used on pieces of land of the same value, and drilled in rotation at the same time with rapeseed. The result was that Nos. 1, 2, and 3 took the lead at first, and the guano rape was not so flourishing; but after the first hoeing of the three first-mentioned, the guano rape gradually overtook that drilled by the three other manures, and when my sheep began to feed the rape in the latter end of July, it was quite palpable that the guano rape was doing the best. After my sheep had been feeding the rape about a fortnight, the rape drilled with the three first-named manures began to show mildew; the rape with the guano was growing luxuriantly without being much affected by mildew, and at the end of six weeks I considered that I had one-fifth more feed per acre after the guano rape than after that manured with Nos. 1, 2, and 3. In consequence of my wishing to try the relative merits of guano in competition with farmyard dung, my sheep fed a piece of early tares and were folded on the land, after which I put a heavy dressing of farmyard manure. One part of the field was left for guano, which I drilled at the rate of two cwt. per acre without farmyard dung. The result of this experiment proved the guano turnips to be much the best. The first time that guano was used in its pure state without any mixture of ashes for turnips, the crop was destroyed, in consequence of the seed coming in contact with it, there not having been a sufficient quantity of earth allowed to cover the manure previous to the depositing of the seed. Having lost my crop of turnips, which was a few acres only, I was induced to re-sow the land with rape broadcast, the seed being covered lightly with the hoes in preference to ploughing, as I wished to keep the manure on the surface. The rape came up with a good plant; but I soon perceived that it grew in rank, just as the manure was drilled; and by the time it was ready for hoeing, where there was no guano drilled, the rape-plant died gradually away. I have mentioned this, because I think it affords another striking proof of the great value of guano. I am sure I may say that during the last three years I have not lost an acre of turnips from the fly where guano has been used; nor have I sustained any injury from the effects of guano, except on three or four acres where I first drilled it in its pure state. Having now, I think, said enough as to the advantage of guano, and shown plainly that in every instance guano has had the pre-eminence, so far as my own experience has extended, I shall now, gentlemen, make a few remarks on the application of guano. In reference to the best system of applying guano for root crops, I certainly advocate the use of the drill in preference to sowing guano broadcast, although on many farms that method is adopted with success, as a means of preventing injury to the germination of the seed—that is, on lands where the ridge-system is practised. The farm in my occupation being best calculated for the drill-system on the flat, I shall confine myself to that mode of application, which, from practical experience, I have found to answer the best. With regard to drills, we have a great variety in use. Many of them I consider very good for drilling artificial manures; but, as economy in horse and manual-labour is a great item in the farmer's expenses, I wish to show that the drill which I have been using, and which was manufactured by Messrs. Reeves, of Bratton Westbury, has many advantages. In 1857 I used Reeves' patent drill with great success. As respects economy, guano can be used either with or without a mixture of ashes. At the same time, I should recommend two bushels of dry ashes mixed with 2 or 2½ cwt. of guano to the acre, which Reeves' drill will distribute with a regularity quite equal to that of any other drill that I have ever used with twelve bushels of ashes. On a farm where the land is somewhat level this drill will with two horses put in nine acres per day, and the same horses will take the manure with the drill for a day's work. I always give one turn with the harrows after the drill, to cover the seed. I should state that the principle of this drill is to deposit the guano, allowing a sufficient quantity of earth to cover the manure before the seed is deposited, which prevents the guano from burning the seed. This drill may be used with equal advantage in drilling guano or superphosphate, either with or without ashes. Our friend Mr. Nesbit, in his admirable work on Agricultural Chemistry, mentions that in drilling guano for root crops it is necessary that the guano should be mixed with four or six times its weight of ashes, to prevent it from burning the seed; but, with all due respect for Mr. Nesbit's valuable information respecting the mixture of ashes with guano, I trust I have shown plainly from my experience that two bushels of dry ashes per acre is a sufficient quantity to be mixed with guano or superphosphate. I hope I have also shown that the drill which I have used is most economical and advantageous. In conclusion, I must confess that my object in introducing this subject has been rather to glean information from the discussion than to give the results of my experiments. I now thank you for your attention, and I shall be happy to answer any questions you may feel disposed to ask me on the subject (cheers).

Mr. J. Thomas (Blestoe) wished to ask Mr. Sainsbury what quantity of ashes he had been accustomed to use to a cwt. of guano?

Mr. Sainsbury said he had been in the habit of using two bushels of dry ashes to 2½ cwt. of guano.

Mr. King: What drill do you use?

Mr. Sainsbury: Reeves's.

Mr. Coussmaker (Westwood, Surrey) wished to make a few remarks founded on his own experience. He had not used artificial manures to a very large extent, having always acted on the maxim, which he learnt a good many years ago, from a gentleman in Northamptonshire, Mr. Hildyard, that a good farm, like a good joint of meat, only required basting with its own dripping. Having kept plenty of stock, he had generally been able to manure his farm with farm-yard dung. He did not mean to deny that artificial manures might be used advantageously in many instances, and especially when a farmer took a farm which was not in good order; but when a farm had been got into good order, it would not, in his opinion, require much artificial manure. With regard to the relative merits of different kinds of artificial manure, he quite agreed with Mr. Sainsbury, that guano was the best of all (Hear, hear). He happened to live in the neighbourhood of Aldershott, where there had been started a new manure, derived from the camp—animal carbon, or whatever they pleased to term it. He was induced to buy a certain quantity of this manure for the purpose of trying it against guano in money value. Having given £7 per ton for this Aldershott manure, and £14 for guano, he used twice as much of the former as of the latter, and the result showed that guano was decidedly superior to the new manure (Hear, hear). His experience with regard to guano proved that, if they entirely depended upon it, they would force the plant very much in its early stages, and afterwards leave it in the lurch (Hear, hear). He thought the best application was a half-dressing of guano with a half-dressing of farm-yard dung. If he had to manure for roots, he would not apply farm-yard dung to half the land and guano to the other half, but would put a half-dressing of each on the whole of the land, experience having convinced him that that was the best mode of proceeding. Mr. Sainsbury had mentioned the drill system; he (Mr. Coussmaker) had always sown his guano broadcast. In so doing, however, he had met with one great disadvantage, and he would be very much obliged to any gentleman who would suggest to him a remedy for it. Guano was of a very light and volatile nature, and if, when sown broadcast, there happened to be much wind stirring, it was blown to a part of the land where the farmer did not want it to be deposited; or, if the locality was near one of the extremities of the farm, it fell, perhaps, on a neighbour's land instead of his own. He had mixed it with ashes, and occasionally with salt, in order to insure a more certain and equable distribution; but that had not always secured the object. He had thus been led to water it, and he wished to know whether his doing so deteriorated the quality of the guano. He had, in fact, never been able to distribute guano as he wished to do.

Mr. J. **Howard** (Bedford) observed that it was very evident that Mr. Coussmaker had not a broadcast machine, as that would have enabled him to drop the guano immediately on the surface.

Mr. R. **Baker** (Writtle) said he had not many remarks to offer on this subject, feeling, as he did, that Mr. Sainsbury knew much more than he himself did with regard to the application of guano. Still there were some points connected with the use of guano which he would proceed to mention, especially as it might easily be subjected to the test of experiment. He had before observed in that club that in his opinion guano should never be applied, either for turnip or for mangel wurzel, immediately before the depositing of the seed. For applying it for turnips he had ploughed it in immediately, and let it remain for ten days or three weeks, or whatever time was required: in the first instance he ploughed it in with a surface ploughing and afterwards with a deeper ploughing, and by that means it became thoroughly incorporated with the soil, and acted in the most beneficial and regular manner, none of its constituent properties being lost. During the turnip-sowing season he had frequently had indicated to him a piece of land where guano was used by the smell a quarter of a mile before he reached the spot. Of course where that was the case a very large proportion of the guano was taken up by the air, and entirely lost to the crop; whereas, if the guano had been ploughed in immediately after it was deposited, and had thus become fixed in the soil, none would have been lost. When guano had once become incorporated with moist soil, no subsequent exposure to the action of the atmosphere would cause it to evaporate. That was a very important point to bear in mind. As regarded the beneficial influence of guano, experiments were often very fallacious. The result of an application of guano depended very much on the state of the weather at the time when it was applied. If there were not sufficient moisture to fix it in the soil at once, it was far less beneficial than it would otherwise be. In reference to its application by sowing or drilling, he must observe that he had not got a broadcast machine; but he sometimes sowed it with a manure-drill, and ploughed it in immediately, which prevented the wind from blowing it about. When sown it should be incorporated with some other substance. He sometimes used decomposed sawdust with it; if salt was desirable for the land, he used it with that; and he generally combined it with wood ashes, or some other substances, in order to prevent it from being taken off into the air. It was well known that guano was much more beneficial to land which comprised a large quantity of loam or clay than to gravelly soils; the reason being that when it was incorporated with loam, it was immediately fixed, whereas if used in gravelly soils, it was very apt to be carried off. Having used guano for a great many years, he must pronounce it to be, in his opinion, the cheapest manure that could be employed—especially for root-crops. Whatever might be the case with regard to corn-crops, for turnips and mangel-wurzel it was undoubtedly the cheapest manure they could use, notwithstanding the high price of it. He had been led to the belief that a large portion of the beneficial qualities of manufactured manures consisted of guano in another form (Hear, hear). About a week ago, a person asked him to purchase some manure, and in so doing said—"We have two kinds of manure, turnip-manure and corn-manure; but the latter contains twice as much guano as the former." The price of the one being £1 more than that of the other, then what was the advantage of buying the cheaper article, when you must apply two tons instead of one? (Hear, hear.) He wanted to get, if possible, a cheap manure; but so far as his experience enabled him to judge, there was, in fact, no cheaper manure for root crops than guano. (Hear, hear.) His opinion was, that for ordinary use there was nothing so cheap, and nothing so beneficial in the production of root-crops, as guano; but its beneficial application must, he maintained, depend very much upon the state of the weather and the soil, and upon the mode of application.

Mr. **King** (of Beedon) wished to know what amount of guano he considered a sufficient dressing when he did not use any farm-yard manure?

Mr. **Baker** did not hesitate to say that guano might be applied liberally for root crops, but when applied to corn crops any quantity beyond 2 cwt. per acre produced comparatively with the increased cost but little benefit. He thought 2 cwt. per acre was the maximum that should ever be applied for corn crops, and that for root crops that quantity would yield a better return in proportion to the cost than any additional quantity. Some years ago Mr. Vernon made some experiments, the results of which were published in the *Gardeners' Chronicle*. It was there shown that 2 cwt. was all that could be usefully applied for corn crops; that although a larger application might yield an apparent advantage in the foliage and so on, still when the produce was put in the bushel, or weighed, the increased outlay was not justified by the result.

Mr. J. **Thomas** (Bletsoe) said, he had been in the habit of applying guano for several years past. He had invariably applied it with farm-yard dung. He generally cultivated his turnips on the Northumberland or ridge system, putting a fair quantity of farm-yard dung, then sowing the guano broadcast, and reversing the ridges. He usually mixed about 2 cwt. of coal ashes—having a steam-engine of his own he found this mixture economical—with about the same quantity of guano, and also about 15 or 16 tons of farm-yard manure. He had on two occasions tested guano by a comparison of it with blood manure, and on his turnips, produced with the aid of the two, being weighed separately, he found very little difference in money value between blood manure and guano. He did not concur, however, in the observations which had been made to the effect that whatever might be the price at which guano was sold, they must have recourse to it, and it alone; for he thought that would depend on the price at which they could obtain other artificial manures (Hear, hear). He perfectly agreed with Mr. Baker, that guano answered better on clay land than on gravelly land. Having a portion of each on his own farm, he had invariably found the greatest effect from guano on the clay. Some allusion had been made to bones. Now on grass lands he had used as a manure a mixture of bones, guano, and salt, at a cost of 50s. per acre. He had also used guano by itself, and bones by themselves, but the mixture had answered best. In some counties it was quite proverbial that bones were preferable to everything else; but in Bedfordshire he had found the best application to be a mixture of bones, guano, and salt. In growing mangel-wurzel, particularly on land recently broken up, or broken up within ten years, an admixture of salt with guano in the right proportion was a very great advantage. During the last two years he had used an equal quantity of salt and guano, and he had in consequence found his produce considerably larger, and the result more satisfactory in all respects than was the case before. Perhaps on stiff and heavy clay land such a mode of application might be open to objection; but where the land was porous an admixture was, in his opinion, very beneficial.

Mr. J. THOMAS (Lidlington Park, Ampthill) wished to make a few remarks in reference to this subject. First, with regard to the maxim cited by Mr. Coussmaker, that a farm ought, like a joint of meat, to be basted with its own dripping. It was true that under certain circumstances a farm should be left to provide its own manure; but if by an application of extraneous manures it could be cultivated more profitably than without them, it ought not to rest contented with the course of proceedings followed in reference to a joint of meat (Hear, hear). It was a matter of calculation to the skilful farmer how far any outlay upon foreign manures would be recompensed by the return which he would obtain for that outlay. (Hear, hear). He had no wish to enter at any length upon the use of guano for corn crops, because the question stated on the card had reference solely to root crops; but this might be laid down, he thought, as a general rule, that if by laying out £1 they could obtain £1 5s., the money would be exceedingly well laid out; whereas, if by laying out £1 they could, in consequence of the low price of corn, only secure 15s., the money would be very badly laid out. (Hear, hear). If they expended an extraordinary amount of money in the production of corn crops, it was, of course, in the hope of being remunerated in the sale of the crops. They all knew that when the market for manufactures was glutted, the manufacturers, instead of continuing production at the same rate as before, made their operatives work short time till the market was relieved; and so with regard to corn crops, it was, he thought, unwise in the agriculturist to lay out his money to increase his production when the market was already so glutted that he had great difficulty in disposing of what he had on hand. Dismissing, however, from his mind the subject of corn crops, he now approached the question on the card, namely, "The advantages of guano for root crops, and the best system of applying it without injury to the germination of seed." The first point which occurred to him was the portability of guano—a very important feature in its applicability to the land. This enabled the farmer to scatter manure over the farm at the minimum expense for carting. The farm-yard manure might be applied nearest home with half a dressing of light manures, while the more portable manure was conveyed to a distance. As regarded the best mode of applying guano for root crops, he should not speak without the book, having been a very large consumer of guano for many years. He had found it the greatest use in the growth of mangel wurzel, and in Bedfordshire, where the land had got so exceedingly sick of Swedish turnips that they could scarcely rely upon them at all, it was becoming more and more the practice every year to grow mangel wurzel upon lands which were formerly under ordinary circumstances cultivated for the turnip crop. He would now tell them what course was adopted there, and it was a course by which he had never failed to obtain a large crop of mangel wurzel. He always endeavoured to get his land into good tilth, and this object he secured by means of Coleman's cultivator, which he believed to be the best. Having the stetches made 27 inches apart, he mixed two cwt. of guano with two cwt. of salt; or whatever might be the quantity of guano, he used an equal quantity of salt, in order to prevent that distribution over the neighbourhood which had been mentioned by a preceding speaker (Mr. Coussmaker). What he was now about to mention might appear a very operose proceeding, but it was always fully justified by the result. He set a man to sow the mixture of salt and guano under hand, as it were, down the different stetches, in order that none of it might be carried away by the wind. After that the stetches were reversed, being rolled down with a heavy iron roller. Experience had convinced him that the more solid the land could be made for mangel wurzel, the more reliance they could place on the subsequent crop, and the heavier would be the weight per acre. He believed, that all who adopted this method of growing mangel wurzel, using an equal quantity of salt with guano, sowing the mixture under hand in the stetches, and afterwards reversing the stetches, would secure a very large crop. He never used any farm-yard manure for root crops, it having been shown by the experiments of Liebig, Mr. Lawes, and Mr. Nesbit, that when this fertiliser was used for crops of corn the phosphates remained for the future crop of roots without being at all deteriorated. He trusted he should be excused for having stated thus minutely his own practice—a practice which, he would add, had always resulted in success. (Hear, hear.)

Mr. HARRISON (Clifton Hampden, Oxon) felt compelled to differ to some extent both from Mr. Sainsbury and from Mr. Baker: from the former, inasmuch as he advocated the application of guano in its pure state to the soil, without mixing it with any other material; and from the latter, inasmuch as he was in favour of sowing it in its natural state broadcast. As regarded Mr. Sainsbury's mode of application, he thought that, as guano was such a very powerful substance, there was great danger of its killing the seed if brought in such close contact with it; while as respected Mr. Baker's plan, he was of opinion that, as guano was such a very expensive article, instead of sowing it broadcast, they should endeavour to lower the rate of cost by mixing it with other articles. His own plan was to reduce by five or six times its natural weight, by mixing it with sand or mould, and in that state to drill it in with the seed. He believed that, with the present price of the article, that was the only mode of securing an adequate return.

Mr. SAINSBURY wished to say one word in reference to what they had just heard. He knew from experience that guano could be applied unmixed with ashes without at all injuring the seed. One bushel of ashes to a cwt. of guano might appear a small quantity; but it was, in fact, an ample proportion: he had used it year after year.

Mr. E. PURSER (New Bridge-street, Blackfriars) said they had heard that evening the opinions of several practical farmers: he appeared before them as a dealer in and manufacturer of manures. They were all agreed as to the value of guano as a manure for root crops; but, as a seller of manures, his chief business from the month of April to the month of June lay in superphosphates; and he believed that for the thinner and weaker soils superphosphates were extremely valuable in combination with guano. He was now giving them the experience of his office with regard to operations extending over nineteen years. Year after year he found superphosphates in increasing demand for root crops, and for one ton of guano he now sold three tons of superphosphate of lime. If farmers used things that did not pay, it was not his fault; and, on the other hand, he would not pretend to set up his own experience against the practice of the gentlemen present. He had a very extensive connection with Ireland; and in that country, where rain was nearly always falling, superphosphates, as an addition to guano, were found invaluable. In short, these manures were making their way to a much greater extent than the meeting appeared to have any idea of. They all contained bones, in a soluble state. He had watched the action of manures in the county of Sussex, where also he had a very large connection, and he had found that for root crops the demand in almost every instance was for bone manure, with an addition of one cwt. per acre of guano on the weaker soils.

Mr. **Marsh** (Sandwich, Kent) said, having sold a great deal of manure, besides having been a farmer for many years, he could fully bear out Mr. Purser's observations. Where he had of late sold one ton of guano he had sold three or four tons of superphosphate of lime. He sold a great deal of manure in the neighbourhood of Dover, and any gentleman who had seen the hills in that locality must feel how enormous would be the expense of carting ordinary manure in that part of the country. He had there found that a mixture of a small quantity of guano with superphosphate was the best manure that could be applied for turnips.

Mr. J. C. **Nesbit** said, he wished to make a few observations on this subject, especially as it was one which he had to some extent studied. In the application of guano they must have regard not only to the mode of application and to the roots for which it was to be applied, but also to the quality of the soil. The quality of the soil often made a very great difference as regarded the result. He thought that every practical farmer present would acknowledge that, as a general rule, guano was much more valuable in soils which were deficient in organic matter than in soils naturally rich in that material, or which had received, by feeding sheep or cattle, large quantities of oilcake, and other similar matters, and which had been cultivated for a considerable time. Upon poor soils guano acted most powerfully, not only yielding an increase of fifty to one hundred per cent. in the root crop, but also leaving a large amount of ammoniacal matter undecomposed for the subsequent crops. The idea was pretty general that guano, if sown in a dry state, would not act. They need not, however, be particularly alarmed about any loss in their fields arising from drought, or even from moisture, though the former might affect the particular crop to which the guano was applied. They might lose as regarded a particular crop, but the guano would still be in the soil, available for the next crop. As to the effects of moisture, he had in two or three cases analysed specimens of the cargoes of guano vessels which had been wrecked. In the case of a wreck which occurred near Liverpool, the cargo was subjected to the influence of the tide for five or six days, and on examining some of it he found that it had only lost two per cent. of its ammonia. In another case, which occurred at Falmouth within the last two months, a vessel, with 2,400 tons of guano on board, having sunk in five fathoms of water, some of the manure was dredged up, and sent to him for analysis, and it gave 13½ per cent. of ammonia. Guano, on the average, contained 16 per cent. of ammonia; and in the first case which he had mentioned the loss was only 2 per cent, and in the second 2½ per cent. With regard to the application of guano for root crops, it would, he believed, be found best to unite with it some other substance. In a little work which he published some time ago, he remarked that, when guano was used alone, it ought to be mixed with four or five times its weight of some other matter. The first time that he ever saw a field sown with guano was in 1843. A friend of his, in Kent, then sowed twenty acres of turnips with guano, and did not get a root, as the guano was drilled with the seed, and killed it. It was subsequently cross-drilled, and a good crop was the result. My friend subsequently altered his drill so as to deposit the manure about two inches below the seed, and he then succeeded in getting good crops. The guano, however, was mixed with mould, or wood and peat ashes. He believed that, as a general rule, the best way of using guano for roots was to sow it broadcast, and to harrow it in. If the ridge system were adopted, as was recommended by Mr. Thomas, it ought to be broadcasted over, and then the ridges formed ("No," from Mr. Thomas, of Lidlington, and Hear, hear.) He spoke in accordance with his observation. He had seen it applied in that way, the ridges being flattened, and the turnip seed drilled with superphosphate of lime; and he must say that, in his opinion, broadcasting with guano, and drilling with superphosphate of lime, was the best plan that could be adopted. There could be no doubt that, for mangel wurzel, guano was preferable to superphosphate; though, in that case, he should recommend the use of 6 cwt. of salt per acre. He would also recommend that a certain proportion of some superphosphate should be drilled in with the seed, and at least 5 cwt. of guano broadcasted per acre. The effect of the superphosphate was to bring the plants earlier to the hoe; and the guano supplied the subsequent nourishment. If manure were confined solely to the lines of the drills, the lateral roots did not get their proper amount of nourishment. It could hardly be necessary for him to refer to the use of guano for cereals. Everyone knew that for them it was the best manure that could be got. Ammonia must be had; and there could be no doubt that, even at present prices, guano was the cheapest form in which ammonia could be obtained (Hear, hear). With regard to rape, he had found that a fairly soluble superphosphate would do better than any other manure. It would perhaps be recollected that about two years ago he lectured to the club on the subject of superphosphate of lime. On that occasion he was rather taken to task for maintaining that the use of too large a quantity of soluble phosphate of lime was undesirable for root crops. He had been very much opposed in that view by many parties. Now he would take this opportunity of stating that all the experiments which he had made since, and all that he had learned from others, confirmed him in the opinion which he then expressed against the use of too large quantity of phosphates in a soluble state. In many parts of Norfolk, Essex, and some other counties of the same geological character, soluble phosphates might perhaps be used in considerable proportions, without any great disadvantage; but if they went westward, to districts where there was a smaller amount of calcareous matter in the soil, they would find that those manures which contained a proper proportion of insoluble phosphate bore away the palm. He might mention that even at Holkham some experiments had been tried, the result of which was that the largest amount of roots was produced by the manures containing the greatest proportion of insoluble phosphates; a manure which contained nearly 28 per cent. of insoluble, and only 6½ per cent. of soluble phosphate, produced the largest crop. One of the most celebrated manure makers in the country came in only seventh in the race. He had thought it right to make this statement, in order to show that the views which he before expressed were not the result of mere hearsay, but were formed from experience. They had, he believed, been corroborated wherever their correctness had been subjected to a practical test. The insoluble phosphate if possible ought to be fine bone.

Mr. J. **Howard** said, having seen guano sown broadcast he must declare that he did not know a nastier job than sowing it by hand, or an operation more likely to give a man the cholera (laughter). He had also seen it applied with a machine, and having no interest in broadcast machines, being neither a manufacturer nor a vendor of them, he must declare his belief that as regarded equability of distribution and freedom from loss by being blown away, the use of a machine contrasted most favourably with sowing by hand. He was aware that a broadcast machine was not a common thing on the farm; but he believed that if the gentlemen around him would inquire carefully into its use, it would soon become a standard implement.

Mr. T. W. GRANGER (Stretham Grange, Ely), said he had used two machines, one made by Messrs. Garrett, of Saxmundham, the other by Messrs. Holmes, of Norwich; both of which would spread in the most level and even manner from 3 to 100 bushels per acre. He thought so well of Messrs. Garrett's machine at the Carlisle Meeting, that he purchased one, and has used it constantly since to his perfect satisfaction.

Mr. NESBIT, adverting to the remarks of Mr. Coussmaker, observed that it was very easy to mix guano with such an amount of water as would prevent the wind from blowing any of it away. Having seen the machines mentioned by Mr. Granger at work, he could bear testimony that they distributed manures beautifully, and in any quantity that might be required.

The CHAIRMAN, in closing the discussion, said he need scarcely remark that he concurred in what had fallen from Mr. Sainsbury with regard to the value of guano as a manure. He thought, however, that very great risk attended the application of it at different seasons and on different sorts of land. He recollected that the first time he ever used guano it was in the second or third year after it was first imported. He drilled 3 cwt. per acre with his seed on the flat, and the consequence was that he lost his crop; that convinced him that drilling it was not the most desirable mode of proceeding. The next year he looked right and left among his neighbours for information, and he then found that the best system was that of sowing guano broadcast; that system he had followed ever since. He had always sown an equal weight of guano and salt; and had taken care to sow, if possible, on a moist day—a condition on which the ultimate benefit greatly depended. On one occasion (a dry season) he sowed on a damp morning, expecting rain, which happened to be followed by very dry weather, and the result was that he lost a considerable portion of the manure. As regarded the application of guano with the seed, the machine mentioned by Mr. Sainsbury might comprise all that was required. He fully concurred in the opinion that a mixture of guano with some other substance was the best application for root crops. In conclusion, he would again express a hope that they would soon see guano sold at a lower price.

Mr. J. THOMAS (Lidlington Park) said, he should be sorry if it went forth to the world that they had then heard for the first time in their lives of such a drill as had just been referred to. A quarter of a century ago it was the common practice in Bedfordshire, when a light dressing was used, to put the dressing in to the depth of about three inches, after which there followed the hoe or rake that covered up the manure, and after that, again, the coulter that deposited the seeds of the mangel-wursel.

Mr. SAINSBURY then replied: Adverting to the last remark of Mr. Thomas, he said he did not dispute that there was a drill in use five-and-twenty years ago; but the drill which he had described was of a different description: the work was done without the assistance of a rake to cover the manure. He took it for granted that the drill to which Mr. Thomas referred would not drill guano or superphosphate of lime in a pure state; whereas, that which he used would deposit 2 cwt. or 3 cwt. of guano either with a bushel of ashes or without them.

On the motion of Mr. GRAY, seconded by Mr. R. BAKER, a vote of thanks was accorded to Mr. Sainsbury for his paper; and,

On the motion of Mr. THOMAS, of Lidlington Park, seconded by Mr. CONGREVE, thanks were also voted to the Chairman.

This terminated the proceedings.

THE TRIAL OF THE STEAM-PLOUGH AT SALISBURY.

People who would have had Milo make his first essay with a full-grown bull—who teach infants their first steps upon the debris of a hard-baked fallow—and who think the earliest steam-carriage should have attempted a miry clay lane—such reasonable individuals are content for the steam-plough to break its shares among the ungrubbed roots of a felled forest, or strike fire on the flints of Salisbury hill. But for our own part, we would urge upon the Council of the Royal Agricultural Society the desirability of selecting a tolerably level field of average friable loam or clay devoid of big boulders, for the ensuing trials at Chester. Rely upon it, the season in which the work has to be performed will of itself operate against the action of the implements so as to render the ploughing sufficiently difficult.

If the Society defrayed all expenses of the exhibitors, a trial like that at Salisbury would merely stultify the inventors, disappoint the great concourse of visitors, inflict the reproach of public disgust upon the whole subject of steam-tillage, and egregiously waste the funds of the members. But when the exhibitors are invited to compete for the reward of their long toil and ruinous outlay of capital, to bear very heavy expenses in preparation and competition, and are then fixed in a situation where no fair display of their capabilities is possible, they may certainly consider themselves hardly used. However, we are all willing to "let bygones be bygones," and to regard the Royal Agricultural Society's business with a kindly spirit, only let it treat us more considerately at the coming meeting.

Let us now record what the judges and stewards say of the matter, in the Society's own Journal. Messrs. Clarke and Owen say: "The ground was altogether unsuitable; the soil was very shallow and unusually flinty; and the summer's drought had so hardened it, that it was with great difficulty that the ploughs in the upper part of the field could be made to enter it at all. The site also of the field, upon a hill of considerable elevation, occasioned great difficulties and delay." The senior steward, Mr. Wren Hoskyns, says: "Such a soil, in such a situation, hardened to such a condition not only by its own flinty nature but by the long-continued influence of one of the most extraordinary seasons that has ever been known, were enough to render any trial practically abortive." And again: "It was upon this elevated spot, accessible only from a narrow road by a still narrower turning, very steep, and partly over soft fresh-cultivated ground, that the steam-ploughing was to come off, if at least it could ever come on." Respecting the question—Whose fault was it that such ground was provided? he adds: "The temptation of an unenclosed space of eight-and-thirty acres for these trials can hardly be called the inducement of the Society to accept the offer of such a spot, because *there was no other choice;* but it is to be hoped that, in all future negociations with the towns or localities at which the summer meetings shall be held, the very ample area required for this class of trials will be regarded as a preliminary condition." And, after referring to the abominably difficult road leading to the field, he concludes: "Still the judge and stewards had no choice in the matter; and it is only to be hoped that they may never be called upon to exercise their duties under the like circumstances again."

Mr. Smith, of Woolston, would not exhibit at Salisbury. Mr. Williams, of Baydon, finding what sort of place had been provided, objected to such a trial altogether, and endeavoured, as we believe, to persuade his brother-exhibitors to refuse to mock the public and injure their own credit by entering upon a hopeless task. Mr. Collinson Hall, Mr. John Fowler, jun., Mr. Charles Burrell, and Mr. John A. Williams have now addressed the Council on the subject, complaining of the past, and offering suggestions for the future. In considering this petition or manifesto, let us bear in mind the official statements with regard to their several machines, and the results of the trial.

Inadequate and faulty as the experiments were, Mr. Hoskyns acknowledges "the admirable docility and power of Mr. Boydell's (Burrell's) traction-engine;" and says further, "No one, who saw the work performed, even under these adverse circumstances, by Mr. Fowler's plough, could doubt that, in his case at least (not to the least disparagement of the other competitors), steam-*ploughing*, as such, had attained a degree of excellence comparable in point of execution even with the best horse-work. As to the relative economy, there seems little reason to doubt that the calculations arrived at by Mr. Amos and others the year before, at the adjourned trial at Boxted Lodge, were sufficiently near the truth to leave *a very inconsiderable difference in favour of horse-work.*

Five of the judges report that Mr. Boydell "triumphantly ascended the hill to the ground laid out for ploughing, and fully proved his power as a traction-engine. He shortly commenced ploughing; but this was not satisfactory, for nothing could keep the ploughs in the ground." Mr. Collinson Hall is praised for the "strenuous and laudable" efforts which—with great cost—overcame the shameful obstructions on the road, and "succeeded eventually in bringing up his engine, and making good work." Mr. Williams's system is "anything but satisfactory;" and his personal conduct described as objectionable. We suppose in consequence of his being unable to restrain his indignation, and manifest the sublime patience which characterized Mr. Hall, in spite of repeated vexatious accidents. The work done by Mr. Fowler is declared to be "very good; but here we must say we could not reduce the price per acre below that of the Boxted trials. As far as ploughing is concerned, we think Mr. Fowler's arrangement of his ploughs is the best we have seen. As judges we wanted very strict data to recommend the steam-ploughing to the public; we are sorry we cannot do this, though we think Mr. Fowler still stands pre-eminent over any others. We cannot say that his ploughs are 'economical substitutes for the plough or the spade.'" Considering the great ability shown, and the great expense incurred by Mr. Fowler, they recommend the Council to "vote him a medal."

Two other judges, in a separate report, say, "the object to be accomplished was a more economical mode of ploughing than could be done by horse-power. For ourselves we were at once convinced that no satisfactory decision could be arrived at..... Sufficient was shown to convince us that Mr. Boydell's engine is one of no ordinary merit, and capable of very useful and extensive farm-service..... Mr. Fowler's plough performed its work very creditably, under all the circumstances of a hard soil and much obstructing company. The ploughing was effected in a truly husbandlike manner, and at a depth not generally reached on such soils. The work was fairly laid, and worthy of comparison with that done alongside it by one of Howard's ploughs in the hands of a first-rate ploughman." Mr. Williams's ploughs, they say, did not work well; and "the compact form and most ingenious adaptation" of Mr. Hall's engine met their approval. They conclude that only "a proper time and suitable soil" are needed to prove that the steam-ploughing can be accomplished in "an efficient and economical manner."

It appears, then, that the only ploughing which was quite satisfactory in point of *quality*, was Mr. Fowler's; and, could the working expenses have been estimated at a very small trifle lower, the work would have been pronounced also "economical." As far as they could tell, the judges made out the cost per acre to be *nearly, if not quite*, as low as by horse-labour.

Now, we have over and over again insisted that the mere working at a trifle less expense *per acre* does not constitute *the main element of economy or saving in a steam-plough;* and it is here that we think the judges have been shortsighted. Indeed, after all, the public may conclude that Mr. Fowler's plough (on the stewards' and judges' own showing) *is* an "economical substitute" for the horse-plough.

Everyone will surely admit that an "economical substitute" for the plough is something that it will pay us better to have, that can produce more valuable results for a certain amount of money. Well, if the steam and the horse-plough both work at the same price per acre, there is the item of *time*, the greater extent of land ploughed in a day, which at once makes the steam-plough the cheapest and best worth having.

The main value of Mr. Smith's steam-scarifiers and cultivators is not in the low price per acre, but in the great quantity of land broken up and cleared in a short time just at the critical season. And taking the acreage cost of work by Fowler's steam-plough and the common horse-plough to be about the same, Mr. Hoskyns says: "If this be true as a comparison merely taken acre for acre, or hour for hour, every one who knows the supreme value of *time* in the autumn months on clay soils, and the difference, in capacity of *day-work*, between a horse and a steam-engine, must be aware that a new multiplier at least of 2, if not more, may be placed to the credit of the steam-engine, regarded as an available power or auxiliary when work is pressing, and when, according to a well-known poetical authority, the best or rather only method to lengthen the shortening days is to "steal a few hours from night." Yet the judges seem never to have considered that, when a steam-plough can work for, say 7s. 2½d. an acre, and horse-ploughs for 7s., the steam-plough may be better worth having (therefore "more economical") than the horse-plough; and this, indeed, is one of the principal points in favour of steam-tillage at all. There is also another element of considerable consequence in the comparative economy between steam and horse power cultivation. It has become matter of experimental proof, upon certain classes of clay soil, remarks Mr. Hoskyns, that "the liberty of a more perfect selection of season, and condition of soil for cultivation, and the absolute, and, so to speak, *repeated* avoidance of the tread of horses, year after year, brings about a permanent and almost constitutional change of character in the mechanical structure of such soil:"—Besides, that the produce on steam-ploughed land has been found in many cases to exceed that of ground ploughed by horses; not only the depth, but the very shaking and disintegrating of the furrow-slices giving a higher degree of pulverization, which promotes active fertility.

We have repeatedly enforced these and other considerations upon the attention of those called upon to weigh the merits of the steam against those of horse ploughs; and, seeing that a (supposed) very *minute excess of actual acreage cost* has been allowed by them to counterbalance all the great benefits accruing from rapid autumn-cleaning and unusually deep working by steam-power, we do not wonder that the above exhibitors feel constrained to appeal to the Council for information as to how and in what light their inventions will be judged next July. Their address must receive some further notice.

ORIGIN OF DURHAM SHORT-HORNS.

SIR,—In your journal of the 22nd of March, alluding to the sales of shorthorns about to take place and now coming off, you say that at one of them, namely, that to take place on the 21st of April, several animals will be offered which are right line descendants through females of the celebrated cow "Favourite," bought by the Messrs. Colling, of Mr. Maynard of Eryholme, and by them christened "Lady Maynard." This mention of "Favourite" and the Colling's stock brings to my recollection a discussion introduced a few weeks ago in the agricultural article of the *Economist*, on the origin of the improved Durham shorthorns, suggested by the publication in a contemporary, the *North British Agriculturist*, of extracts from a journal of the late Major Rudd, of Marlow, in Yorkshire, called "An account of some of the shorthorn stock, late the property of Mr. Charles Colling, of Ketton, in the county of Durham."

As I think these extracts may be interesting to some of your readers, and as I have not seen them elsewhere, I have transcribed them, and have at the same time ventured to send you some observations on the origin of the improved Durham shorthorns. In making them, I may be permitted to say, I do so as a Durham man, with a perfect knowledge of parties and localities, myself for upwards of twenty years a breeder of shorthorns, and one who has long and diligently investigated the subject. I am especially induced to do this at present, because I have of late frequently seen the matter discussed by strangers with an interest that may well put us lukewarm natives to the blush; but in which discussions, as might perhaps be expected, we hear assertions made that to us, who are "to the manner born," are not a little astounding.

Speaking, then, in the character in which I have represented myself to do, I have long since arrived at the conclusion, wherein I entirely agree with the writer in the *Economist*, that, in forming the improved Durham shorthorns the Messrs. Colling proceeded, *generally*, "by care and selection from the local breed of shorthorns which had already attained considerable perfection," and not by crossing distinct breeds of cattle. I am bound, however, at the same time to say that he is mistaken in alleging that "the story of the brothers Colling having used a cross of Galloway blood in the improvement of their shorthorns has no foundation in fact." It is indisputably true that Mr. *Charles* Colling had recourse to such a cross in one family of his shorthorns, which is known, technically speaking, as "the alloy;" to which I shall take occasion particularly to advert, and in so doing it will perhaps be seen why we find "no trace of such crossing in Major Rudd's journal."

The following are the extracts from that journal to which I have alluded:

> No. 1. Old Favourite, was bred by Mr. John Maynard, of Airyholme-upon-Tees. She was got by a shorthorned bull belonging to a Ralph Alcock, who lived near Airyholme, which bull was remarkable for his nice handling. The dam was got by a shorthorned bull belonging to Mr. Jacob Smith, of Givendale, near Boroughbridge. Her grandam was a beautiful roan cow, called Strawberry, bred by Mr. Maynard's father, and got by a shorthorned bull belonging to Mr. Polly, of Worrall, then held in high estimation.
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> No. 2. Young Strawberry, was also bred by Mr. John Maynard. She was out of Old Favourite, and got by a shorthorned bull, bred by Mr. John Charge, of Newton, who sold him to Messrs. John Maynard and Duke Wetherill. This bull went by the name of the Dalton Bull, and was esteemed a first-rate bull at that time. Young Strawberry was of a beautiful roan colour. In the year 1785, when Mr. Charles Collings first turned his attention to the improvement of the shorthorned breed of cattle, he was desirous to procure the best cows and bulls, and such as had the greatest propensity to fatten. Old Favourite, and her daughter Young Strawberry, particularly attracted his notice, and he was desirous to purchase them. He had some difficulty in prevailing upon Mr. John Maynard to sell them, but he at length succeeded, and they became his property.
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> No. 1. Hubback, when four years old, was purchased by Mr. Robert Collings, of Barmpton, and Mr. Waistell, of Alichill, for the purpose of serving their feeding cows. He had such an uncommon inclination to fatten as to excite the particular attention of Mr. Charles Collings, who purchased him of Mr. Robert Collings and Mr. Waistell, about the year 1785. The judicious selection of Hubback, and of Mr. Maynard's two cows, as before mentioned, may be called the origin of the celebrated stock of Ketton Shorthorns, which for early maturity, inclination to fatten, and to acquire the greatest weight with the least offal, are unequalled by any breed of cattle in the world.
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> The bull Hubback was descended from the stock of Sir James Pennyman, Bart., of Ormsby, in Cleveland, Yorkshire, who, about the year 1770, paid much attention to the improvement of the shorthorned cattle, and purchased the best bulls and cows which he could procure. He purchased several cows of Sir W. St. Quintin, of Scampton, who was then celebrated for his breed of shorthorned cattle. It is probable that Hubback may have been descended from their breed, but the fact cannot be ascertained. Hubback was of a red and white colour, the red inclined to yellow.
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> No. 2. Foljambe, was out of a cow by Hubback, and was got by a bull belonging to Mr. Richard Baker, of Oxney Field, near Darlington, then in estimation as one of the best bulls of that time.

Of these extracts the following corrections or explanations suggest themselves;

The name of the owner of the sire of Favourite's grandam was Mr. Jolly, of Worsall; not Mr. Polly, of Worrall. The Dalton bull, better known as Dalton Duke, was bred at Dalton by Mr. Charge.

The received version of Hubback's pedigree is, that he was out of a cow belonging to Mr. Snowdon, of Hurworth, in the county of Durham, given to him by his landlord, Sir James Pennyman, of Ormsby Hall, in Cleveland, which Sir James had obtained from Sir Wm. St. Quintin, of Scampston, in the East-Riding of Yorkshire; that he was got by a bull belonging to Snowdon; that Snowdon's bull was by William Robson's bull, Robson's bull being by William Masterman's bull, and Masterman's bull being by the Studley bull. As Hubback appears to have been calved in 1777, and is said by Mr. Youatt, in his work on cattle, to have served cows but a short time owing to his propensity to fatten, there seems an inaccuracy in saying that Mr. C. Colling, when he was *beginning* as a breeder, bought the bull at *four years old*, both these dates being assigned to 1785.

The following somewhat amusing account of the purchase of Hubback by Messrs. R. Colling and Waistell is given by Mr. Youatt in the work already alluded to.

Mr. Waistell (from whom Mr. Youatt had this information, in October, 1832) used to admire this calf (Young Hubback) as he rode almost daily by the meadow in which it grazed, and at length he attempted to purchase it from the owner. The price asked, £8, seemed much for a calf not a year old; and the reputation of the shorthorns not being yet established, the bargain was not struck. Still he longed for the young beast; and happening to meet Mr. R. Colling near the place, he asked his opinion of the animal. Mr. Colling acknowledged that there were some good points about him; but there was something in his manner of acknowledging this which induced Mr. Waistell to think that Mr. Colling thought somewhat more highly of the calf than his language expressed, and therefore he hastened the next morning to conclude the bargain, and paid the money. He had scarcely done so, before Mr. Colling arrived for the same purpose; and as the farmers rode home together, they agreed that it should be a joint speculation. Some months passed by, and either Mr. Waistell's admiration of the calf a little cooled, or his partner did not express himself very warmly about the excellencies of the animal, and Messrs. Waistell and R. Colling transferred Young Hubback to Mr. C. Colling, who, with the quick eye of an experienced breeder, saw the value of the little beast.

Foljambe was got by Mr. Richard Barker's bull, of Oxenfield; not Mr. Baker, of Oxneyfield.

Shortly after the Durham shorthorns had acquired the name of "improved" Durham shorthorns, a vehement controversy arose as to the origin of these same improved shorthorns; or rather, as the Collings had been the chief improvers, what the system was they had pursued in their improvements, or what, in short, they had bred from.

On the one hand it was maintained that this system had been that alleged by the writer in the *Economist*—"Careful selection from the local breed of shorthorns, which had already attained considerable perfection," in doing which they skilfully perpetuated excellences and obliterated defects. On the other, that it had been one of crossing in the extreme sense of the term, namely, the commixing of the bloods of totally different breeds of cattle.

The maintainers of the latter position were two-fold, who arrived from it at totally different conclusions. The first of them, being owners of Herefords and other rival breeds, asserted it to be a law of nature, that by crossing from animals of distinct breeds, no third or improved one could be obtained having the power of perpetuating itself; that the progeny always and shortly reverted to one or other side of the parentage; and that the improved shorthorns, having been produced by this kind of crossing, would speedily come to an end and totally disappear.

Upwards of fifty years have, however, elapsed; an the improved Durham shorthorns still hold their own, still continue to propagate their kind, their offspring showing no departure from the long-established type and character of their ancestry; and either, therefore, the theory of these objectors as to the effect of crossing was erroneous, their arguments fallacious, or they were in error as to the facts, the latter being undoubtedly our opinion.

The other class of supporters of the doctrine of extreme crossing were parties who, being owners of stock having in it the Galloway cross or "alloy," contended that this crossing was the system on which the Collings had proceeded universally, and that it was, in truth, the right mode of improving.

It may be here not unnaturally asked, how came it to pass that this subject had become a matter of conjecture and of controversy? Was nothing known as to the system the Collings had pursued? What were the facts? The brothers Colling appear to have been retired, reserved men, little thinking that their cattle-breeding proceedings were to become matter of public curiosity, or were to provoke controversy. They kept no record of their proceedings while they were in operation, nor did they leave any at the last; and seeing, as we have said, that the interests, or supposed interests, of various parties conspired to make it expedient to mystify the facts, it is not surprising that they were so mystified to a great extent. Now, however, that this mystification is passing away, the facts are, in our opinion, abundantly obvious. There had existed time out of mind, on both sides of the river Tees, from Barnard Castle downwards to Yarm, a peculiar breed of cattle—the Teeswater or old-fashioned Durham shorthorns. And long before the names of the Messrs. Colling had been heard, those of the following breeders and improvers of them had obtained celebrity, namely, Milbank, Brown, Hill, Wright, Charge, Maynard, Jolly, Hutchinson, Sharter, and others. And long before Ketton or Barmpton were known as shorthorn localities, the following places were in repute, namely, Barningham, Aldborough, Barton, Cleasby, Manfield, Stapleton, Dalton, Newton, Morrell, Blackwell, Oxenfield, Hurworth, Eryholme, Worsel, Sockburn, &c. This being so, where was it likely the Collings (living in this immediate neighbourhood), when they had determined on becoming breeders, went for their originals, but in the direction where a breed had long been in esteem, and where they had ample materials from which to make their selections?

In reference to this, Mr. Hutchinson, the author of the curious little history of the Sockburn shorthorns, written nearly forty years ago, says, "The editor of the *Farmers' Journal*, some time ago, asked whether the improved shorthorns originated in select individuals, or were obtained first by a cross? To which let me here answer, From individuals (I can hardly say *select* as regards Mr. C. Colling's stock) picked up by that gentleman at his own back-door, without trouble or expense: and no doubt he took the best he could come at." Knowing, as we do, the skill and tact of these gentlemen, we may feel assured that whatever this author may say of the absence of trouble or expense, what they "took" in this way—"the best they could come at"—were by no means despicable animals. Indeed, he says, as an instance of their judgment in such matters, that at the time they succeeded in buying "Old Favourite" and "Young Strawberry" of Mr. Maynard, they tried to buy one of the Sockburn shorthorns bred by his great uncle, Mr. J. Hutchinson, but could not succeed.

But though it may be fairly assumed that generally they did go to their own back-doors—into their own immediate neighbourhood—to get what they wanted in the way of native shorthorns, and the great majority of their pedigrees conclude with a dam by Hubback, without giving any pedigree to her dam, yet we have not a few memorable instances of the pedigrees of their stock going beyond this.

Assuming, then, that Durham shorthorns are an indigenous race, established time out of mind in the localities mentioned, of which further evidence will be adduced, we have in the old-fashioned animal really a pure-bred animal. And if, as often occurs at sales of professed improved shorthorns, the pedigrees do not go back more than four or five descents, a purchaser may feel safe as far as purity goes. I by no means, however, recommend such pedigrees to persons beginning breeding in earnest, but that, like the Collings, they should get "the very best they can come at." And with a little diligence they may obtain stock descended in a right line through females from the best animals the Collings possessed, as well as others descended in the same way from the stocks of those who, as we have seen, were even their predecessors, namely, the Milbanks, Hutchinsons, and others.

With a view to aiding them in their search, I shall mention several extant descendants in a right line through females of some of the Collings' best known cows, and also descendants of the same description from the stocks of the other parties we have alluded to. I take, in the first place, the descendants of those of the Collings' cows, whose pedigrees go even beyond Hubback, namely—1, Favourite; 2, Princess; 3, Duchess; and 4, Fortune. And, first, with regard to the descendants of Favourite or Lady Maynard, who may indisputably be taken as "No. 1" when treating of shorthorn pedigree. Favourite had of daughters, Young Strawberry, Miss Lax, and Phœnix. Young Strawberry was by Foljambe, the dam of "Lord Bolingbroke," who was sire, by the O'Callaghan Galloway, of the bull "Son of Bolingbroke," who by "Old Johanna" was the sire of "Grandson of Bolingbroke," wherein we see the origin of the Galloway cross or "alloy," hereafter to be discussed. Phœnix having had by Bolingbroke the celebrated bull Favourite, had also by "Grandson of Bolingbroke" the cow Lady, from whom chiefly are descended the branch of shorthorns having "the alloy." Phœnix also had, by her own son Favourite, Young Phœnix, who by the same Favourite had the renowned "Comet," the first, and for many years the only bull sold for one thousand guineas. Of these two daughters of Favourite, viz, Young Strawberry and Phœnix, I am not aware of there being any right line descendant through females; and so proceed therefore to her other daughter Miss Lax, who was, as well as Young Strawberry, by Dalton Duke. From her descended, through females, No. 4 at the Chilton sale, and through her many other animals at the same sale, several of which went to Ireland. Lord Spencer, then Lord Althorp, bought Nos. 13 and 55, esteemed amongst the best. They were both daughters, as we have seen, of No. 4.—No. 13 being by St. Albans of the "Princess" family, and No. 55 by Monarch of the "Favourite" family.

During Lord Spencer's life, female descendants of these cows were rarely if ever to be obtained. But by the three sales of his stock at Wiseton they were dispersed. The No. 13 line, belonging to Lord Spencer, seemed at one time to have concentrated in Roguery by Mercury who was a grand-daughter of No. 13. She, however, was very prolific, and had of cows, Zeal, Zinc, and Zone, and of bulls Zadig, Zenith, and Zoroaster. Zeal, a very fine cow, bought at the first Wiseton sale by Mr. Wilkinson, of Lenton, had many descendants, both while belonging to that gentleman, and previously when belonging to Lord Spencer—Prophetess, Prudence, Wiseton Lady, &c. The same, as to descendants, was the case with Zinc, who had Teturia, Metal, &c. It appears that it is through Zeal and Zinc that there are descendants of No. 13 to be offered at the sale you allude to.

No. 55 had also many descendants who were brought into the market at the Wiseton sales. Of these, Enigma was purchased by Mr. Topham, and Florentia by Lord Ducie. From Enigma and Florentia there appears to be, at the same sale, descendants of No. 55.

The Princess Family.—The pedigrees given of Princess are not only various, but conflicting. At the sale of Sir H. V. Tempest's herd in 1813, she is said to have been by Favourite, her dam by Favourite. The same pedigree is given in the 1st volume of the Herd Book published in 1822. The 3rd volume of the same book, published in 1836, gives her pedigree, as being by Favourite, dam by Favourite, g. d. by Hubback, gr. g. d. by Snowdon's bull, — by Waistell's bull, — by Masterman's bull, — by the Studley bull. This is to be found in the pedigree of her grandson St. Albans (1412). Again, where the pedigree of the bull Belvedere (1706) is given in the same volume of the Herd Book, she is said to have been by Favourite, dam by Favourite, g. d. by Hubback, gr. g. d. by Snowdon's bull, — by Masterman's bull, — by Harrison's bull, — bought by Mr. Hall, of Sedgefield, of Mr. Pickering. Princess was, as we have always heard, an extraordinarily fine cow, and the late Sir H. V. Tempest, of Wynyard, in the county of Durham, who was an admirable judge of the points and excellences of the whole animal kingdom, from a race-horse or short-horn down to a game cock, resolved, it seems, on being her owner at any price. It was never known what he gave Mr. R. Colling for her, secrecy on that head appearing to have been part of the bargain; but it has been said to have been as much as 700 guineas. Princess and her numerous descendants were sold in 1813, after Sir Henry's death. The late Mr. J. Wood, of Kimblesworth, bought one of her daughters, Nell Gwynne, then in-calf to Wynyard, and she afterwards produced St. Albans. We believe the pedigree of St. Alban's, and consequently of Princess above alluded to, to have been furnished by that gentleman, and we are sure, from our thorough knowledge of him, with the most perfect good faith. We cannot but suspect, however, that an error has crept into it, from a confusion of the pedigrees of sires with those of dams—Waistell's bull having been by Masterman's bull, Masterman's bull by the Studley bull. At this sale Angelina, the daughter of Anna Boleyn, another daughter of Princess, was reserved; and at a subsequent sale a daughter of Angelina was bought by Mr. J. Stephenson, of White House, Wolviston, a neighbouring tenant farmer. From her descended Belvedere, who became the property of Mr. T. Bates, by whom, we believe, the pedigree of Belvedere, and consequently of Princess, was furnished. We have heard Mr. Bates say, speaking of the pedigree of Princess, that such it certainly was, because her dam was own sister to Mr. R. Colling's white bull. Yet, according to the pedigree of that bull, given in the Herd Book, he would have been own brother to Princess. Who shall decide when such doctors disagree? We feel, however, justified in assuming that Princess belonged to the class of those descended of cows belonging to the Collings', which had a pedigree before they obtained them, whether her first-recorded ancestress was "bought by Mr. Pickering of Mr. Hall, of Sedgefield," or was by "the Studley bull." Of whom they obtained her, it is not we believe known. Nell Gwynne, Mr. J. Wood's purchase, became, as we have said, the mother of the well-known St. Albans; and Mr. Mason, of Chilton, having obtained of him St. Albans' services for some time, he became thus, as we have seen, the sire of No. 13 at the Chilton sale, the ancestress of Lord

Spencer's Old Roguery, and her numerous progeny of Z.'s. Nell Gwynne had but one heifer-calf having descendants: this was by Layton (366). Mr. Wood sold it to Mr. Troutbeck, of Blencoe, in Cumberland, who had been his pupil. By Mr. Troutbeck this heifer was christened 2nd Nell Gwynne. Of Nell Gwynne the 2nd many descendants in a right line of females have of late years appeared in the market, and not a few have attained show-yard honours. At one time, however, a notion existed that Mr. Troutbeck had not been very select in the choice of some of his bulls.

From Angelina, the granddaughter of Princess, descended Belvedere, obtained, as we have seen, by Mr. Bates, from Mr. J. Stephenson, and to this cross with his Duchesses Mr. Bates always attributed the greatest advantages. Those who knew his worth knew also his strong prejudices, one of which was against the "alloy;" and a strong suspicion exists that Lawnsleeves ought to have had a place in the pedigree of Belvedere; but a belief having existed that, according to the Herd Book pedigree, Lawnsleeves had the alloy in it, he was accidentally omitted. Some years ago the writer, when on a visit at Elmore, the well-known residence of the late George Baker, Esq., the owner of Lawnsleeves, discovered, on reference to dates, that Lawnsleeves' dam could not have been the daughter of the "alloy" George, but probably by Mr. Mason's George, who was much nearer at hand, that gentleman, moreover, being well known to Mr. Baker. Had this been but sooner known, the discussion *need* not have *occurred*.

Mr. J. Stephenson still has right-line descendants through females of Angelina, though he is not easily persuaded to part with them.

Those which we have mentioned were considered for many years the only right line female descendants of Princess, but recently a new family has appeared from Northamptonshire, claiming so to be, as to which we are not prepared to speak authoritatively in the negative.

The Duchess Family.—Mr Bates's Duchesses, they may be called, being all of them, at one time, in his possession, and being all christened by him Duchess, with a numerical distinction. They descend from the cow Duchess, bought by him at Mr. Charles Colling's sale, in 1808, and whose pedigree was then given as being by Comet, dam by Favourite, g. d. by Daisy bull, gr. g. d. by Favourite, — by Hubback, — by James Brown's red bull. We are not aware whether the cow by Mr. J. Brown's red bull was purchased or bred by him. Assuming the former to be the case, which we believe, she belongs to the class of cows having pedigree when he bought her, though of whom he did so we are also ignorant. It is generally understood that the Duchesses were not going the right way, when Mr. Bates bethought him of introducing the Princess cross through Belvedere. Hearing of his existence, and of his being the property of Mr. J. Stephenson, he went to Whitehouse to have a look at him, and, as we have heard him say, the door of Belvedere's house being locked in the absence of Mr. J. Stephenson from home, he had his first inspection of him through a hole in the wall, and the bull appearing just what he wanted, he too seemed to have exclaimed Eureka! eureka! Having ultimately succeeded, as we have said, in obtaining him from Mr. J. Stephenson, from thence dated the fame of the Duchesses. Since Mr. Bates's death they have passed into many hands.

The Fortune Family. — The first recorded ancestress of this family was obtained by the Collings, from Mr. Maynard, as were Old Favourite and Young Strawberry. The pedigree of Fortune is, that she was by Bolingbroke, her dam by Foljambe, g.d. by Hubback, gr. g. d. bred by Maynard. She was the dam of many celebrated animals, both male and female, namely B (45), Irishman (329), Cripple (171), Trunnell (659), St. John (572), Gaudy (p. 320), and Nell (p. 422). B (45) was the ancestor of Portia (No. 2 at the Chilton sale) who was the dam of Lady Sarah (No. 20), the highest priced cow at that sale. No. 4 at the same sale was a right line female descendant of Nell, and Nos. 35 and 51 were daughters of No. 4. There are still right line female descendants of Nell, and we owe it to that most distinguished breeder in another department, Mr. Jonas Webb, to mention his name as being a possessor of such descendants.

The Daisy Family. — Of the Collings' cows from whom right line female descendants are existing to this day, but which cows have no pedigree assigned them previously to their being in the Collings' possession, we believe there are but few. There is one, however, well-ascertained family, which must not be omitted, namely, that of Mr. C. Colling's "Old Daisy." Her pedigree is — got by Favourite, her dam by Punch, g. d. by Hubback. She was own sister to the "Daisy bull," of whom Mr. Bates always made especial mention when recounting the pedigree of his Duchesses, the Daisy bull being one of their, in his opinion, most-valued ancestors. Of the right line female descendants through females of Old Daisy, we remember to have seen two or three at Mr. Jefferson's sale, at Fulford, near York, last summer, which brought high prices, and there are some, we see, at one of the sales this month—that of the 21st.

Of the right line descendants, through females, of cows belonging to breeders of shorthorns antecedent to the Collings, now existing, we have an instance in what may be termed

The Milbank Family.—The Milbanks, of Barningham, were amongst the very oldest recorded breeders of shorthorns. One of their cows appears to have come into the possession of Mr. Coates, and was by him named "Milbank," from which there are existing right line descendants through females at this day. At two of the sales you allude to members of this family are to be disposed of.

The Sockburn Family. — Another family of this description is "the Sockburns," originally belonging to the Messrs. Hutchinson, of Sockburn, one of whom, as we have said, wrote a history of them. Either while in their possession, or as we believe subsequently, the last of the Sockburns having right line descendants through females was put to Major (397), a son of Lady, imbibing thus the "alloy." Notwithstanding his antipathy to the "alloy," Mr. Bates became the owner of one of her thus alloyed descendants—a strong proof of its merits; and from her he bred, using Belvedere, and again one of his Dukes. From this cross have descended animals of first-rate character at this day, one or more having been purchased by Colonel Towneley, and have distinguished themselves in the show-yard.

It must not be thought that in having confined myself to the pedigrees of those families of shorthorns which can establish right line descent through *females* from cows having pedigrees at the time the Collings purchased them, and from cows belonging to their predecessors as breeders, I in the least undervalue those pedigrees which are computed merely from sires. It was to establish and illustrate my argument, *that Durham shorthorns of celebrity were in existence before the Collings began their career as breeders, and that there are at this day right line descendants through females of the principal cows they bred from, and* *from cows belonging to their predecessors,* that I adopted this course.

Though shorthorn breeders compute the pedigrees of their cattle, as do the Arabs their horses, by their dams, either animals are in fact as much descended from the dams of their sires as from the dams of their dams; and thus in the pedigrees of shorthorns, containing such names as Foljambe, Bolingbroke, Favourite, Comet, &c., those to whom such pedigrees belong are in fact equally descended from Old Favourite, Young Strawberry, Miss Lax, &c., as those which trace their descent from cow to cow.

I proceed now to address myself, as I promised, to the subject of "the alloy." It originated, as we have seen, from what has been unceremoniously called O'Callaghan's polled galloway. Now, this same O'Callaghan was Colonel James O'Callaghan, of the noble house of Lismore, and a great friend of the late Duke of Cleveland, one of whose boroughs he represented for many years in the House of Commons. The Duke, as Lord Lieutenant, also made him Colonel of the Durham militia. Having pitched his tent, in the decline of life, at Heighington in that county, he there ended his days, as he had lived, a very popular character. Having bought a couple of polled galloway cows, he had no difficulty in getting Mr. C. Colling, his near neighbour, to allow him to send one of them to his bull Bolingbroke. She produced a bull calf. It was a roan, in due time had *horns*, and showed all the other indicia of a true-bred shorthorn. Such was "Son of Bolingbroke." Mr. C. Colling bought him and his dam of Colonel O'Callaghan, and put his cow, old Johanna, to this son of Bolingbroke. She produced a red and white bull calf, who, like his father, took in all respects after the Shorthorns. He was yclept "Grandson of Bolingbroke (280)." To him Mr. C. Colling put Phœnix, daughter, as we have seen, of "Old Favourite," and she produced "Lady," as she had before done, by Bolingbroke, the bull "Favourite," the father of Comet; and also (by her own son, Favourite) Young Phœnix, the mother of Comet. Lady was the dam of Washington (674), Major (397), George (276), and Mr. Wright's Sir Charles (592), and also of Countess and Laura. At Mr. C. Colling's sale, in 1810, this alloy stock sold at very high prices—Major for 200 guineas, George for 130 guineas, Lady herself, at 14 years old, for 206 guineas; Laura, her daughter, for 210 guineas; Laura's daughter, Young Laura, at 2 years old, for 101 guineas; and Countess, the other daughter of Lady, was *bought of Major Rudd, of Marton, for 400 guineas.* When we meet, therefore, with descendants of "Grandson of Bolingbroke," or of Major, George, or Sir Charles, such as "Western Comet" (689), Frederick (267), Keswick (453 and 1266), or of Countess or Laura, we encounter the alloy. But what do we therein encounter that is base or injurious? What is the meaning of alloy? Here we have a cross with a breed of cattle of first-rate character and quality, and polled Galloway breeders might equally say they had been alloyed by the Shorthorn cross We are satisfied, however, that in fact "the alloy" never took—that it was utterly and speedily thrown out—and that, as did the son of the polled Galloway by Bolingbroke, so did all his descendants adhere to the Shorthorn side of the house. I have never heard that any of them were without horns, or exhibited the least trait of the polled Galloway, except, it may be, in the analogous good qualities of that breed. I incline to think there is truth in the theory that, in crossing distinct breeds, the offspring does take exclusively at once, or very shortly, to one or other side of the house.

We appear then to have, in the instance of the alloy, an illustration of M. Malingié Nouel's ingenious theory of the difficulty of changing the type or characteristics of a long-established breed, and that this difficulty is in proportion to its purity of blood, or, in other words, to its antiquity.[*]

If this be true, the non-infection of Shorthorns by the alloy affords an additional argument in favour of the ancient and indigenous character of the breed. But had the first offspring of this cross partaken equally of the bloods of its different parents, in what proportion would the Galloway blood exist in any modern Shorthorn? Seeing how early capability of procreation exists, and is called into operation in that breed, and also how rapidly generations of cattle pass away, I do not believe there is an extant Shorthorn which has an appreciable particle of the Galloway blood in its veins. I must say I think this kind of crossing, or, perhaps, rather attempted crossing, a mistake—a mere waste of time.

Take the case, well-known to greyhound coursers, of Mr. Goodlake's bull-dog cross. Considering the position the dogs thus "alloyed" hold as to their "public performance," does any one think this cross has been injurious, or can any one from their appearance discern it? Yet we think it was a mistake.

Being of opinion, then, that the alloy has done neither good nor harm *directly*, I am not so sure that indirectly it may not have done good. Those who had it in their stock became less scrupulous on the score of pedigree, and, unlike pedigree martinets, looked less to that than to the good qualities of a bull. It may be thus, perhaps, explained how it has come to pass that many animals having in them this once dreaded bugbear, the alloy, have taken the highest places in the show-yard. I do not allude more particularly to these animals, lest I should revive against them this stupid prejudice of "the alloy," and a more stupid prejudice, a more complete phantom cannot exist. Breeders, however, will understand my allusion. We maintain it then to have been established by this narration *that the Collings in general, notwithstanding what Mr. Chas. Colling did in a particular instance, formed the improved shorthorns by careful selection from the local breed, which had already attained considerable perfection.* That such is the antiquity and indigenous character of the old-fashioned shorthorns, such its native purity, that even should any commixture of ingredients of another kind have taken place, yet like an infusion of the same sort with the waters of father Tees, it has been speedily thrown off without affecting its perennial purity.

The owners of our native shorthorns, therefore, may snap their fingers at the ancient myths, as to "wild cattle from Chillingham-park," and "Dutch or Holstein cattle from across the German Ocean." Those who have seen the wild cattle at Chillingham, will bear me out in saying, there is not a single characteristic or point of resemblance exhibited by them which is possessed by the shorthorns, except that shorthorns are occasionally *white*, but they are also sometimes *red*, yet no one has ever ventured on that score to point to the Devon or Sussex breeds as their original. As to the Dutch or Holstein importation, of which one used to hear so much, the writer happened some years ago to stumble on a fact, tending to turn the tables on the Holsteiners. It seems, according to Anderson (in his treatise on Commerce), who quotes from Rymer's *Federa*, that Edward IV. allowed a favourite sister, Margaret, Duchess Dowager of Holstein, to export from this country annually, and for many years into Holstein and the low countries, great numbers of cattle and sheep, for the purpose of improving the breeds of them in those countries. Whence is it so likely they were exported, as from the ports of Hull and Newcastle across the German Ocean? And if it be true, as has been said, that some centuries after, a herd of cattle was found there greatly resembling our native shorthorns, whence may it not fairly be assumed the originals came? And when, as it is said—for it rests only on tradition—some of these were brought into this country, what was this but a re-importation, what was it but that England had her own again? I remain, Yours, &c.,

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[*] See Vol. xiv, p. 214, of the Agricultural Society's *Journal*.

DUNELMENSIS.

THE PRESENT POSITION OF THE FARMER.

The farmer is proverbially prosperous. He has a conventional character to maintain for being well-to-do, that has stuck to him ever since "the war." Just as the Jack Tar is jolly, the lawyer learned, and the soldier gallant, is he to be associated with the making of money. No matter how much he may complain at times, the world always knows bettter. Whatever difficulties he has to encounter, we think only of what wheat was fetching a few years ago. Tradition has told us how, in eighteen hundred and something, a Hampshire man drove into his market ordinary with a pair of horses to his phaeton, and we never lose sight of them. In a word, we are always ready to take the farmer's position at a premium. When he is doing well we make the most of it, and when he is doing badly we say nothing about it.

There are few, not directly interested in the pursuit, who would care to think it was just now somewhat hard times with farmers. On the contrary, the public remember nothing but the high prices of a year or two since. Indeed, to their credit be it said, the tenantry themselves have not forgotten them. The turn they had still enables them to hold on. Let there come a commercial crisis, and people yield at once to the pressure. It is only in the common course of things that Houses should "go" right and left, notwithstanding what they may have profited by previous speculations. All our sympathies are with them. We see and feel what they have had to contend against, and commiserate with them accordingly. But the mere cultivators of the land come in for no such consideration. We only bear in mind how dear bread was, and how much they ought to have saved. And then, again, the weather has been so much in their favour; another point we are always ready to make the most of. "Fine weather for *you* farmers," said a cockney tourist to a friend of ours he met in one of his own fields last autumn. "And not very bad for *you* excursionists," was the apt rejoinder. People are always patronizing his prosperity.

But there is occasionally something far worse in this making the most of it. Landlords, and land-agents especially, are by no means loath to look always on the sunny side. We hear, even very recently, of rises in rent, consequent on the visitation of an experienced valuer. A correspondent recently referred to several landlords who last year gave their tenants notice to quit in order to raise their rents, "the comparatively high prices of the year or two previous having made them uneasy." The question is whether the present low rates will make them feel more easy again? Or, will it be the old story of the boot-maker and his customer—"Well," said the latter, "now they have taken the tax off leather I suppose I shall get shod a little cheaper?" "No, sir," was the answer, "I was just about to raise the price when they did it, so we shall go on as before." Some landlords, perhaps, who were about to raise the price will now go on as before; but at most they must be content with this.

After all, what is it the farmer has to fall back upon? Have the opportunities of the last few years been really so great as the world at large would appear to imagine? The authority we have already referred to runs on thus: "Let us consider what these high prices have been. Wheat has been higher than other grain, the crop of barley of '56 alone excepted. Now, will the average of wheat for the last 10 years exceed 50s. per quarter? If not, there certainly can be no reason for a rise on that score. The fact is, wheat was very dear in 1854-55, from the very deficient harvest of '53, which of course is no benefit to the farmer, to receive a high price for a short crop. I heard of good wheat land that year growing only 3 sacks, that usually grows 9 per acre. Landlords should recollect that high prices, in such cases, are not so beneficial to the farmer as good crops and lower ones." A short crop of wheat, then, does not tell like a bad hop year, although some people really argue as if it did. Even keeping to this question of price, let us see how much the balance of the good times has actually been in favour of the producer. Let us date it from that golden age which came in with Free Trade. In our last week's summary of the business done, it is thus written: "In reviewing prices since the last Corn Bill came into existence, we find the average price for the whole eleven years amounts to 55s. 10d., the extremes being 39s. 5d. per qr. in 1851, and 73s. 1d. in 1856. As the last weekly averages were 44s. 3d., we are 11s. 7d. per qr. below this 11 years' average. Now as only one year and a quarter has elapsed since the highest range, the fall in such a course of time is greater than has occurred before in this short period." We shall be bold to say that, if such a change had occurred in the commercial instead of the agricultural world, we should have heard a vast deal more of its effects. As it is, we must not neglect the signs of the times.

Amongst the most valuable intelligence, we certainly regard the monthly County Reports. We are justified in announcing them as supplied by the best men of their several districts. They appear, moreover, invariably in that form in which they are forwarded. No attempt is ever made to dove-tail the opinions in one with that of another. They are, in fact, the independent testimony of men fully qualified to speak on the subject matter of their communications; and it may be well worth our while to see what their latest advices offer on the state of the case. Let us take them as they come, and begin with LINCOLNSHIRE: "As to our own supplies, hundreds thrashed their all immediately after harvest, and it is gone. Beef, mutton, pork, and wool are all lower in price; the latter not much in request. It is customary to compare the early spring stock markets. We find upon the average the difference in price as compared with the two preceding years, in cattle and sheep, is about thirty per cent. This is a great depreciation in the value of agricultural produce, and will ere long show itself in many distressing cases of individual suffering. We have seen so much of this class of trial and misfortune as to make us tremble for one's friends and neighbours, each of whom having suffered a loss of one-third of their property in a few short months."

NORTHUMBERLAND endorses these fears with yet more startling facts:—"The monetary crisis that collapsed on the commercial interests of the country in November has not failed to recoil on food-producers, and wherever rash speculation or the most rigid economy has not been observed, sequestration of effects have since Christmas taken place over this once-flourishing locality to an extent unprecedented, we believe, since the first ten years of the present century: confidence is shaken to the core, and every business transaction worked out 'from hand to mouth.' We have never disguised our opinion that the profit of the farm would be *nil*. Then we lived in hope of quiet reaction in trade: our markets, on the reverse, continue languid in the extreme; every return shows a downward tendency. Whenever reaction takes place, the million will, for a time at least, be dependent on foreign supplies of breadstuff. Granaried corn, we believe, is unusually scant; and looking at the corn in bulk, also considering defective yield from our last crop, the quantity to be realized from the stack is certainly less than usual at this period of the year. Nor can we say much in favour of the rising crop."

From CAMBRIDGESHIRE we have but another echo of the complaint: "The price of nearly all farm produce has gone down very much—indeed, too low for the well-being of the farmers, very good wheat selling at 5s. per bushel, the coarser sorts still lower; while the stock of the farm has greatly deteriorated in value, and the fattening of all animals has been this year a desperately losing game. There appears a very heavy cloud at present over-shadowing our agricultural prospects; and we take our mark amiss if those farmers who have lately taken their farms at an advanced rent do not find out their mistake. We have not an over-weening disposition to look at the gloomy side of the picture, but there is no mistaking the fact that the loss of property by the British farmer within the last six or nine months (in one form or other) amounts to a most frightful sum."

From BERKSHIRE we have, more especially, intelligence on the present price of stock, all to the same end:—"The trade in beef is extremely depressed, more particularly for inferior descriptions; the general dulness of trade is also felt in mutton. Fat lambs are scarce, and great activity in the trade has prevailed during the last week. Porkers and bacon hogs meet a sluggish demand, at receding prices. Veal is also cheaper. The trade in store sheep is dull, and prices have given way from 2s. to 3s. per head. Prime cows just calved sell fairly, but all other descriptions of horned cattle share the general depression. Store pigs, particularly the larger ones, are difficult to sell. Good horses of all descriptions sell readily, at about 20 per cent. cheaper than last year; inferior sorts are neglected. There is scarcely anything doing in wool. Hay continues quite a drug. There is rather more inquiry for straw. Potatoes hold out well, and early sorts for planting have been in fair demand. The lambing season is now nearly over, and the increase is moderate; in some of the large flocks considerable mortality among the ewes has prevailed." WARWICKSHIRE confirms this:—"The fairs have been well supplied with fat stock, for which there is a slack demand." And DURHAM adds:—"Our fat cattle markets have been well supplied, and prices have had a downward tendency. Grazing has not been remunerative; of cattle that were bought-in in October and November, in many instances their keep has been given away."

In a yet more noted district—LEICESTERSHIRE—"The price of all kinds of stock has of late been declining, and is lower than this time last year; yet the market for beef and mutton being depressed, the grazier is very cautious of buying at present prices. Fat beef is selling at 5d. to 6½d., and mutton in the wool at 6d. to 7d. per lb." And, "Wheat has receded in value till it has reached a figure at which it is not remunerative to the grower."

YORKSHIRE declares: "Fat is plentiful, and bad to sell at anything like remunerative prices to those who purchased feeders in the autumn."

The climax comes appropriately in the concluding report of the whole number, that from SOUTH SHROPSHIRE: "The worst symptom at present is the gradual fall in the price of beef and pork; mutton is also lower, but not to the same extent. Instances are very numerous in this part of the country where cattle have been fed for five or six months, and sold out recently at less money than they were bought in: indeed, we have heard of instances where less than the cost-price has been accepted, even though the animals had been kept on the best food the farm produced. At our local fair at Ludlow, on Tuesday last, the top price of beef was 5½d. per lb., and a good deal changed hands at 5d., or a trifle over, several of the best lots returning home unsold. It must also be observed that the quality of the animals shown at the above-named town is first-rate, being almost entirely of the Hereford breed."

A reference to the recent reports of the meat market will show a still further decline. The trade never looked so bad as it does at this moment.

Shall we sum all this up? The average price of corn is lower than has been known for many years. Cattle and sheep never brought a worse return. Good manures are unprofitably high; and taxation quite as heavy as ever. Still the farmer has made the most of his opportunities. No one will deny but that within the last few years the art of agriculture has greatly progressed. All we ask for it is fair-play; more particularly from those most interested in its advance. Let us hear no more of "harsh cases." Let us have no more sharp practice in raising rents, simply because a bad man may be ready to outbid a good one. Let landlord and tenant pull together, and the Firm will pull through.

IMPORANT TRIAL.—VERDICT £1000.

SALE OF CATTLE AFFECTED WITH PLEURO-PNEUMONIA.—VERDICT FOR THE FULL VALUE OF THE CATTLE.

Kildare Spring Assizes.—Before the Lord Chief Justice of Ireland.

MALCOLMSON v. M'DONOUGH.

Mr. M'Donough, Q.C., stated the case for the plaintiff. It became his duty to state the various facts and circumstances from which he asked them to find a verdict of substantial damages. The action was one of considerable importance to the parties concerned, and the public in general. It was particularly important, as the defendant would seek to involve the case in some difficulty, arising from matters, not of fact, but of opinion. No question was raised as to the existence of the warranty. It was a fact which the defendant could not deny. If a single heifer were diseased, the party could bring an action, and recover damages for it; but in the present case the plaintiff sought large damages for the infliction of a great wrong. The defendant should show that the cattle were all sound, as warranted. The plaintiff would prove that they were not sound; and the case would eventuate in an inquiry as to the amount of damages. The plaintiff resided in the county Carlow; he held several grass farms in the county Kildare. He possessed 1,500 acres of feeding land. The defendant, Mr. Walter M'Donough, lived near Ballinasloe, county Galway. He was one of the most extensive stock farmers in the county. He held vast tracts of land in Galway, Roscommon, Mayo, and the King's County. In a great degree he confined himself to the rearing of stock. Upon the 4th of October the fair of Ballinasloe began. Upon the 2nd of October, 1857, the plaintiff was at the fair of Moate, and purchased from a Mr. Hudson ten large bullocks. Upon the 8th of October, the day of the sale of black cattle at Ballinasloe, he purchased the heifers of the defendant. It was desirable to purchase cattle from one person whose respectability was a guarantee for the soundness of the animals which he sold. The defendant had his cattle separate and apart from others, under the great wall of Lord Clancarty's demesne, in lots of 30 each. The plaintiff had previously suffered in consequence of having purchased unsound cattle, and on this occasion he adopted the wise and prudent course of making particular inquiries of the vendors, and in every instance insisting upon engagements. Accordingly, he proceeded to the lots of the defendant and made particular inquiries whether they were sound. He was informed that he might rest satisfied, as he (defendant) had reared every one of them from calves, and he had not a single case of distemper or disease amongst his various lands for the last two or three years. He was asked for an engagement, and he undertook and did give an undoubted warranty. The plaintiff purchased two of the lots, No. 7 and No. 8, each consisting of 30 heifers, at £12 15s. per head. With these lots he did not find fault, because he considered that the disease was confined to lot No. 11. The plaintiff was afterwards solicited to inspect lots Nos. 10 and 11. The defendant pledged himself to their quality; as he said every one of them had been reared by himself, he (plaintiff) need not be afraid, as he would engage every one of them, and if he would consent to take the cattle he might pay him in any way he thought proper. The plaintiff was, accordingly, induced to buy lot No. 10 at the rate of £12 15s. per head, and to purchase eventually the remaining lot, No. 11. He likewise purchased ten bullocks from Lord Ashtown. These heifers were brought to Carlow; they stopped at intervals along the road, and were taken care of by a trustworthy servant. Upon the 12th October they stopped at Mr. Johnson's, of Miltown, near Athy, where they were permitted to remain for the night. Mr. Johnson observed that two of the heifers laboured under the disease; one of them being considerably worse than the other, and he considered that the lot was distempered. The cattle were removed to a farm of the plaintiff's, which was situate a few miles from Carlow (Garryhindon). The plaintiff saw the cattle in the morning, and he perceived that one of them was distempered. He separated the diseased beast from the rest. She was so bad that he sent her to Smithfield at once; and instead of selling her, they were at once obliged to slaughter her. In a few days another heifer in lot No. 11 exhibited symptoms of distemper: 170 beasts in all became infected with and displayed symptoms of this latent infirmity and disease. It appeared that the disease, which first exhibited itself upon the continent, was in the year 1842 or 1843 introduced into Ireland. A post-mortem examination of the animal plainly demonstrated that it was a disease which grew upon it day after day. The affection was this—the lungs adhered to the side, fastened, as it were, by ligatures; it was difficult to tear the lung from the side, and became necessary, in fact, to tear them asunder. The period of development ranged from three to six weeks, and this fact coincided remarkably with the present case. The learned counsel then read several letters which passed between the plaintiff and the defendant. In reply to a communication from the plaintiff to the defendant, written on the 20th of October, 1857, he (defendant) stated "that he had no sickness amongst his cattle for two or three years; that lot No. 11 were not fed upon the same farm as the others had been; that the latter, which he had since, were yearlings, and had been fed in Roscommon, where no sickness had been for three years; that lot No. 11 had been bought last April with others which had been sold only in September to the butchers at Ballinasloe, and that there had not been any complaint from any quarter in reference to them. The plaintiff examined more closely lot No. 11, and discovered that they could not have been reared by the defendant. Some of them had different brands, and some were not branded at all. This lot he separated from the others. He kept lot No. 11 at the farm to which they had first gone, and he scattered the rest among his other farms. The result, however, was that the infection spread. On the 1st of November, 1857, the plaintiff wrote to the defendant, stating that he was sorry at being obliged to inform him that he had four of the heifers of lot No. 11 very bad with the lung distemper—that there must have been some disease in that lot for a considerable time, although he (defendant) might not have been aware of the fact, and that he was preparing to send them by a float, as the railway company would not take sick cattle in their trucks. The defendant did not answer these or other letters. There was a complete examination of lot No. 11. A Mr. Shaughnessy acted on behalf of the defendant. The plaintiff said that there must have been some disease amongst the cattle. Shaughnessy was rather reserved in his manner, but he said he was certain the defendant could have warranted every lot from No. 1 to No. 10. It would seem that lot No. 11 was a mixed lot, which had been collected for the purpose of rapid sale. It was arranged that the cattle should be shipped to Liverpool, and disposed of there. A proposition was made to leave the matter to the arbitration of two respectable and experienced gentlemen; but this was not carried into effect. On the 27th of November, 1857, a letter was written by the plaintiff to Mr. Shaughnessy, telling him that he had been obliged to ship six of the heifers that day, and three of them on the previous day, in all eleven; and that "it was surely madness in the defendant not to give instructions to him in reference to what he desired to be done with the remainder, as the loss would and must eventually fall upon him" (defendant). On the 28th November, 1857, another letter was written by the plaintiff to the defendant, to which there was not any reply. Upon the 30th of November another letter followed, complaining that six more of the cattle were ill, and informing him that he should send them off that very night, requiring instructions as to what he should do with the cattle, and expressing his firm conviction that all of them would die. After this the plaintiff announced that three more of the beasts were sick of the distemper, and that prompt measures were required on the part of the defendant, otherwise they could not be rescued from the disease, and the loss consequent upon the distemper could not be averted.

The plaintiff deposed as follows:—He is an extensive grazier, holding about 1,500 acres of land, chiefly in Carlow and Kildare; he had known the defendant nearly three years; he was a large stock proprietor; on the 2nd of August he bought about ten bullocks from Mr. J. Hudson, at his place, near Athlone; these were afterwards sent home along with the cattle purchased from the defendant; the 8th of October was the black cattle fair day at Ballinasloe; the defendant had a particular stand by the boundary wall of the fair ground, in lots of thirty, so that they were completely separated from the rest of the cattle; the warranty given by the defendant was to this effect; he said, "By my honour, my dear fellow, I have not had a case of distemper or disease amongst my cattle for the last two years; I have had them almost from the time they were calves, and I can warrant every heifer which I have in the fair as sound," and putting his hand upon his shoulder, he said "Now buy a few lots from me;" witness purchased lots Nos. 7 and 8, for £12 15s. per head; required the cattle with the view of selling them in the following summer; after he had made this purchase from the defendant, he went through the fair and looked at several lots; he bought lot No. 10 at the same price; subsequently bought lot No. 11, and with these also the same warranty or engagement was given; sent lots of the cattle to his different farms, which were separate and far apart in the county of Carlow; the disease broke out amongst the cattle in every instance; the nearest farm to Dublin upon which he had the cattle, except one farm, was forty-four miles.

Cross-examined by Mr. Battersby, Q.C.—One of the heifers had slipped her shoulder, and she died upon the road; wrote to the defendant in reference to this, and he in a very handsome manner sent him a £5 note; he considered that it was a very handsome thing to do, as there was no warranty given, and the defendant was not bound to act as he had done; and this he would say, he very much regretted having had any misunderstanding with the defendant; had several "strippers" on his land in August last; perhaps he had 50 or 60; had no old cows; could not tell how many hundred horned cattle he had on his land in that month; had several hundreds, about 250; had these from the previous October; his man had sold beasts to a butcher named George Hirley; had only two distempered cows on his land before the 1st of October, and these he disposed of at once; in the year 1847 he lost 125 head of cattle; could not tell where he bought these, but could swear positively that he had no distempered cow on his lands for nine months before the fair at Ballinasloe; about nine or ten years ago a man of his made an engagement about a horse he sold to a party, and he (Mr. Battersby) defended him; before he bought the cattle heard that there was a good deal of distemper in the fair; would not consider it safe to put sound cattle upon land where there had been distempered cattle before three months; thought there was great danger from the virus, the saliva, distempered mucous, and droppings from the mouths of diseased cattle remaining upon the land; the disease was not perceptible for one month to six weeks; detailed the symptoms exhibited in the first week after its development; the animal gets off its feed, has a cough and weeping eyes, &c.; the disease is highly contagious, and he believed infectious; the defendant said to him that statements were valueless; he went to a table, took up a book, and said, "So help me God the cattle were sound, and I had not a single distempered cow upon my land."

To Mr. Smythe—The heifers (150) that did not take the distemper were separated from the defendant's cattle; some of them were forty miles asunder.

James Murphy examined by Mr. Maunsell—Was the plaintiff's herd; was present when he purchased the cattle from the defendant; had charge of the heifers; took every care of them; drove them six miles the first day, and nine or ten the next day; delayed longer than usual, in consequence of the multitude of cattle which he had to drive; when he saw Mr. Johnson on his own land he said that the cattle had the distemper, and he pointed out two that had disease; on the next day when the cattle were at Garryhindon the herd said that two of them were sick.

Cross-examined by Mr. Ball, Q.C.—Had the cattle on the field of the hotel-keeper at Shannon Bridge; there were other cattle on that land which had been sold at Ballinasloe; the cattle remained that night at Shannon Bridge; they slept at Frankfort the next night; on the third night they slept at Tinnahinch; paid for the grass; there were no other cattle there; the cattle day, and the day before that at Ballinasloe, were fine days.

To Mr. Maunsell—Prevented the cattle from mixing with other cattle every night.

Mr. George Johnson examined by Mr. Byrne—The herd brought the cattle to his field after the fair; observed two of them lying down on the field, and expressed the opinion that they had the distemper.

Robert Hickey examined by Mr. H. Smythe, Q.C.—Was of the Dublin firm "Hickey and Hanberry;" on the 19th of October sold a sick beast for the plaintiff for £7; she was badly affected with "pleuro pneumonia;" considered that the disease was contagious; the beast must have been sick more than a month; sold other sick animals for the plaintiff.

Owen Dunne examined by Mr. Maunsell—On the 14th of October brought a heifer of lot No. 11 to the butcher; on being opened that beast exhibited symptoms of disease; the lungs and other parts were a mass of yellow matter.

Joseph Kilbee examined by Mr. Byrne—Is a salemaster in Liverpool and a grazier in Ireland; several of the cattle were sent to him which had the lung disease; his experience was considerable; the disease was latent about six weeks before it exhibited itself; was examined as a witness before the House of Commons relative to the disease; witness made the sales for the plaintiff; the cattle, if sound, would have brought £6 per head more than they did.

To Mr. Battersby—Saw the cattle in the fair; did not observe them much, but thought at the time that they were sold at a cheap rate; considered that in a fat market, not a store market, both buyer and seller could know that disease existed in cattle if they were thin; Liverpool was a fat market—a town market; Ballinasloe a store or fair market; cattle were often sold as sound that were unsound; adhered to the evidence which he had given before the committee.

Mr. Anthony Allen examined—Is a salemaster; lives in Wicklow; is an extensive grazier; the disease is highly contagious; it did not develope itself earlier than six weeks; had experience of the disease in cattle that had been sold to himself.

Patrick Maher—Is an extensive grazier in Meath; the disease is contagious; it takes a month or longer to develope the disease; a beast whose lungs were a jelly on the 14th of October must have been infected before the 9th.

To Mr. Ball, Q.C.—Could not say whether the disease was in the air, or was communicated by food or touch, or by all of these; but the general opinion amongst those with whom he associated was that the disease was contagious.

Mr. Battersby, Q.C., stated the defendant's case in an able speech. He knew it would be difficult to counteract the effect that had been made upon their minds by the address of his excellent and most plausible friend, Mr. M'Donough. There was not any doubt that the plaintiff had sustained a loss: the question was, who was to bear that loss? The case for the defendant was, that he had 496 head of cattle, in lots of 30 each, and that not one of them was diseased. The beasts sold to other persons were sound; not a single one of them was unsound. The defendant was not only an honest dealer, but a liberal one also, and it would be a hard case if he were now obliged to pay the plaintiff for cattle that had taken the distemper after they left his hands. There were 98 beasts that had been bought in the month of April. The defendant did not tell the plaintiff that all these had been reared from calves, but he spoke of the first lot at which he looked. On the 21th of August there was one beast that was diseased, but the rest were perfectly sound. Could it be held that a dealer was responsible for every head of cattle that might happen to die? The warranty was not confined to cattle: it was given as to horses, and even in the case of an insurance upon life. Suppose a life, insured upon the 24th of August, exhibited on the 14th of October the symptoms of a latent disease, would it be an answer to the widow that there was an invisible germ of disease? The germ might exist, but this was not the disease itself. When disease did arise it was perceptible from the first moment of its existence. The disease was, in fact, an inflammation of the lungs, and could that disease in a horse be distinguished from the same disease in a cow? There was no law of science or art to show the rapidity with which such a disease progressed, but it was palpable that when it existed it developed itself. The fair of Ballinasloe was full of diseased beasts, and as the disease was contagious or infectious, there was an abundant opportunity for contracting it at the fair, even if the cattle had not been for several days travelling along the road to the farm of the plaintiff. What security was there if a man could be held responsible for the breaking out of any imperceptible "germ"? The effect of such a stringent rule would be, that every seller in Ballinasloe would have a board displayed near his cattle with these printed words, "These cattle are not warranted sound." Were they to trust to such a warranty as that relied upon by the plaintiff, it would be a prolific source of litigation. "Germ, virus, warranty," would be three most magical, most potent words, to put money into the pockets of the bar of Ireland. If they sold a horse, and warranted him as sound, any man who understood the subject could pronounce an opinion as to its soundness; but here was a case where confessedly there was no appearance of disease when the cattle were sold; and because they afterwards got distempered, the defendant was to be held responsible. It was a strange and most dangerous proposition. The learned counsel then called evidence for the defence.

Walter F. M'Donough, defendant, examined by Mr. Ball, Q.C.—Resided near Ballinasloe; grazed about 1,100 head of cattle in the year; sold three lots to the plaintiff at the fair; they had been brought from his farm; 27 of the lot of No. 11 had been grazed upon the island of Innisshank, in the King's County; that lot consisted of 30; three of the lot were fed in Roscommon; there were two cases of distemper on the island, one in July, the other in August; sold two at the fair of Eyrecourt to a butcher for £25; that butcher, whose name was Barrett, had gone to America; never had a sick beast since that day anywhere; sold at Banagher 60 that had been grazing on the island; they were perfectly sound; sold 30 to Mr. Eyre, and 30 to Mr. Malone.

Mr. M'Donough, Q.C., objected to this evidence. Would Dycer in Dublin be permitted to give evidence that he sold 60 horses that were sound as an answer to an alleged breach of warranty in the case of an unsound horse?

Mr. Battersby, Q.C., pressed the question.

The Lord Chief Justice ruled that the evidence was not admissible.

Mr Battersby, Q.C., asked his lordship to take a note that he offered to give evidence that every head of cattle on the island was sound, and that he refused to admit that evidence.

His lordship said that the plaintiff could not be expected to meet the case of the sales to other parties, but it was open to the defendant to give evidence to prove that all the cattle grazed on the island which were sold to the plaintiff were sound, and to give general evidence that the cattle grazed on the land were sound.

The defendant then said that all the cattle sold at Ballinasloe were sound; had seen the lots before the fair; was present at the drawing and lotting of them; there were four lots; all were sound; had not the slightest doubt of it; there was no question about his telling the plaintiff that the cattle were sound; when he bought the first lot, defendant told him that he had reared them from calves; it was not true that he had said this in reference to lot No. 11; since the 24th of August no beast had exhibited disease; ninety head of cattle were sent to the island, and mixed with lot No. 11, in the month of September, and remained till December; all of these were as sound as a bell; a book happened, unfortunately, to be near him on the occasion of the fair; he put his hand upon it, and said he had not given him an unsound beast at Ballinasloe; disease might appear suddenly; could not say whether the disease was communicated through the air.

Chief Justice—He would be a wise man who could.

Cross-examination of defendant—Looked at the lots generally; did not examine their heads or feel their fat; whose brand but his would be on the cattle? bought the cattle (30 of them) at Eyrecourt upon the 24th of April, and the others on the 7th of May, at Ballinasloe; could not say in which of these places the lot was bought; the two distempered heifers sold in July and August were of those bought in April or May; made the sale to Barrett; positively said that he did not swear in the arbitration room that he had no distemper on his lands for two years; looked into his books, and found that nineteen months before the fair of Ballinasloe there was a case of distemper in a cow; in 1857 there were two cases of distemper on the land.

Mr. Samuel Garnett examined by Mr. F. Johnson—Saw the stock, and was of opinion that they were sound, and did not know from whence the disease came, no more than the captain of a vessel could say how the tempest arose; had known cattle said to have been unsound turn out to be perfectly sound.

Mr. Peter Aungier—Is a salemaster; cattle which he had seen well at night, were in the morning reported as being ill; had known cattle when slaughtered exhibit disease, of which the seller had no idea.

Mr. Patrick Leonard — Heard the defendant say to the plaintiff, taking up a book (a registry of his), "As sure as that is a Bible, the cattle I sold at Ballinasloe were sound;" always thought a herd could at once detect the disease; was of opinion that the beasts were sound.

The Lord Chief Justice charged the jury. He said it was not necessary for him to do more than occupy their time for a few minutes, in stating the rights of the plaintiff and the liability of the defendant. The question was, whether the heifers that were sold were at the time of the sale all sound, or whether any of them were affected with any disorder? There was another issue—whether, if some of the cattle were affected, they did not affect others? If this were so, the party was liable, not alone for the original damage, but also for the consequences of that original damage. It was a case in which the defendant had warranted that all the cattle were sound; it was in vain to say that the warranty was a puff. It was admitted that the defendant had warranted them. The question was, were the cattle sound agreeably to the warranty? The effect of a warranty was this—it made a man responsible for all defects known or unknown to the seller; and it was no defence for him to say that in his conscience he believed that the cattle were sound. He had given his warranty—he had induced the buyer to purchase upon the faith of the engagement that the cattle were sound, and he had guaranteed him against any loss which might result from the purchase. It had been said that if this were to be the consequence of a warranty, every man at a cattle fair should put up a placard intimating that he did not warrant the cattle. All that he had to do was to hold his tongue and give no warranty at all; besides this, there were insurance offices that would willingly insure cattle and protect the buyer from any loss consequent upon the sale. In conclusion, his lordship said that the jury should look to the gradual development of the disease in the cattle of the plaintiff himself after they became mixed with the cattle sold by the defendant, and consider whether, under all the circumstances, the plaintiff was entitled to their verdict.

The jury retired, and in a few minutes returned with a verdict for the plaintiff upon all the counts—Damages £1,000 sterling.

LABOUR AND WAGES.

Mr. James Howard, of the well-known firm of agricultural implement makers, recently delivered a lecture on this subject to the members of the Bedford Working-men's Institute. The address, which did great credit to Mr. Howard's powers as a lecturer, is too long for us to give entire. The conclusion is, perhaps, the more applicable to our columns:—

Wages vary in different trades considerably, and where the work is equally laborious. How is this; is it an accident, or is there any law which influences the rate of pay? I think there is. Why should an oak sell for more than a willow or a fir, or even than elm and ash? Simply because it costs more to produce: an oak takes generations to come to maturity, therefore several lots of fir trees could be grown and sold on the space occupied by the oak. I said before that the cost of production rules the price of all commodities; and as labour is a commodity, it rules that also. How so? Why, any awkward fellow can sift gravel and very soon shoulder a hod, but to be able to build a good wall, or turn a nice arch, requires the labour of a practised bricklayer. It costs, therefore, more in time and money to produce a good bricklayer than to make a slab—to produce a good smith than a hammer-man—a good engineer than a stoker. An engineer obtains better wages than a bricklayer or a carpenter; for the same reasons, the bricklayer gets better wages than the slab, *i.e*, it costs more in time and money to make a youth a proficient engineer than it would do to make him a bricklayer. Pleasantness of occupation and freeness from risk are also elements to be taken into account. A man won't go down into a coal mine and work for the same price as he can get in the light of day. Men don't leave pleasant employments for less agreeable ones without hoping to better their condition. Occupations requiring greater strength or bodily labour than others are also better paid. When men mow grass they get better pay than when trimming a hedge. So with furnace tenders and rollers of metal, where, owing to heat and exertion combined, a good deal of sweat is lost, and a good deal of beer poured down to supply the waste; their wages are necessarily higher, for the simple reason, it costs more to keep them up to the mark. We could multiply such reasons at great length, such as continuous employment; but I hope I have said enough to prove that wages do not depend on chance, but are on the main regulated by some general principle. There is one principle I have not alluded to, but which all will do well to bear in mind, for it not only influences wages, but leads to constant employment—I mean a good character. 'Tis said a "rolling stone gathers no moss," and I do not know what is more likely to make a man roll than a bad character. I intended to go into the question of piece-work, but time will not permit. I like the system, as it enables the workmen to earn higher wages, and the master pays for no more and no less than is done. I never had any difficulty in letting a job by the piece. I hear there are difficulties in other trades, but I think they would vanish when the system came into operation. 'Tis worthy of remark and consideration, that those trades have made the greatest progress where piece-work has been the rule. It gives the industrious and skilful man a great advantage over the lazy and unskilful one. It also sets the energies of mind to work to find out readier and quicker methods of getting over work; and I hope to see the plan more generally adopted in Bedford. I quite believe it would answer in the building trades. I have no time to enter on overtime. It may do with your slow day-workmen; but 'tis of no advantage to men by the piece. We have hitherto spoken mainly of the labour of the hand: we will now turn to another kind of labour, and this by no means the easiest kind. I mean the labour of the brain, quite as important as the other—to none more so than to the working classes; for it is by the labour of the brain that man's bodily labour is profitably conducted, new branches of industry opened up, new material discovered on which to expend labour. Many of you visited the Great Exhibition, 1851, and were doubtless impressed, as I was, with this idea—What an amount of thought and ingenuity has been expended in bringing our manufactured products to their present high degree of perfection? Why were we before every other nation in the excellence and variety of our manufactures? Simply because we had brought to bear on them more mind, or, in other words, a greater amount of reasoning and intellectual power; and, mark you, 'tis only as we keep in advance of other countries that we shall command the trade. If you could buy as good a saw made in Bedford as in Sheffield, you would not send to the latter place for it. So with the American—if he can buy as good hardware in New York as in Birmingham, he will not send across the Atlantic for it; nor will the French, the Austrians, the Russians, continue to send to England for agricultural machinery, unless we continue to produce better than they can get at home. So excellent as our manufactures doubtless are, we must not stand still, but use every effort, both men and masters, to make something still better. Improved machinery has the effect of saving labour, and therefore was supposed to diminish employment. I am aware that it does so in particular instances; but, as I will attempt to show, the effect is but temporary. There is one very hackneyed but very striking illustration. It is nearly four hundred years since printing was discovered. Great numbers of men were employed in writing and copying books. Owing to the amount of labour, books were very dear. A bible cost £30, so very few people had bibles. The immediate effect of this discovery was, that these writers were thrown out of employment. Now suppose, for the sake of keeping these men employed, or for the love of clinging to old methods, the world had destroyed the presses, can you estimate the loss which would have been entailed on the world? At all events, we should not have wanted the army of printers we now employ. Take, again, the cotton and woollen trades, now about the most important branches of our national industry. On the introduction of the power-loom and Arkwright's spinning machinery, great distress resulted to the hand spinners and weavers of Lancashire and Yorkshire. Suppose they had successfully opposed, as they attempted, their introduction, and stuck to the old method, what would have been the result? Why, not a single hand would now have been employed in the cotton trade in those districts; the machinery would have been transplanted to America or the Continent. We need not, however, travel beyond Bedford to prove that although machinery may for a time be injurious to one class of working men, that it is beneficial to the mass. Some of you are aware that at Well-street foundry we have a new system of making castings by machinery. The moulders, of course, looked upon the machines at first with no friendly eye, for with a machine one man can do as much work as two or three could by hand. It did not do the moulders much good, I confess; nor, I think, a great deal of harm; but how did it affect the other branches? In this way. Last year we made 500 more implements than we could have done without the moulding machines; consequently a great number of smiths, fettlers, fitters, painters, and porters were benefited, whilst the machines only affected the interest of some half-dosen moulders. Again, look at railways. Most of us remember their introduction, and what a hue-and-cry was raised about the ruin they would bring upon coachmen, guards, ostlers, innkeepers, proprietors, and even farmers were dragged in, for we should want no horses, and therefore no horse corn. Well the country has not been ruined, if a few of the class I have named did not do so well as before. We should all be sorry to go back to coach days: 12s. to go to London on the outside of a coach in six hours, &c. Some of us remember the war waged by agricultural labourers against thrashing machines, and how they broke them up and burnt them; but time changes men's ideas, and now these very men refuse to thrash with the flail. Had it not been for the steam thrashing machine after the harvest of 1856, we should have had bread at famine prices, for the old stock of corn was all gone, and we had to live upon the new crop. The demand, therefore, for the new crop was so great, that all the steam thrashing machines were kept in constant work for months. I verily believe, if it had not been for steam thrashers, the 4lbs. loaf would have been at 1s. 4d. Machinery raises man's intelligence. I don't believe in man's doing the work of brutes; I look upon man as too noble to be made a machine of. I remember he is made in God's image, and I hope to see the day when every description of labour which taxes the physical powers of man, shakes his frame, blunts his intellect, and such as is only fit for beasts of burden, will be performed by machinery. Surely it will be better, as in the steam thrashing machine, instead of employing man's brute force in exceedingly laborious occupations, to overcome them, his intelligence shall be employed in directing machinery to perform it. It is a startling fact, that until the introduction of machinery, especially the steam engine, the progress and population of the country went on very slowly; but who can measure all the strides it has since taken? In 1780, less than 80 years ago, just at the dawn of the new era, when machinery came to the help of labour, our population was about 8 millions, now it is above 20 millions; while the increase from 1575 to 1750 was not more than about 1½ millions. The rapid increase in the number of the people, as well as their improved condition, clearly indicate that the means of employment and subsistence had been materially enlarged; and I think you will agree with me that this advance in population and wealth can only be accounted for by the fact that the machinery, which it was feared would diminish employment, has enormously increased it. To oppose machinery, therefore, is to fly in the face of the best friend the working men of England ever had, and is about as wise as it would be to attempt to shut out the light of the sun. Having endeavoured to show the importance of labour, I shall, in bringing my subject to a close, glance at the respectability and dignity of labour. If we turn to sacred writ, we find the praises of industry sounded throughout its pages. We read—"The hand of the diligent shall bear rule." "Seest thou a man diligent in business: he shall stand before princes; he shall not stand before mean men." The patriarchs, the apostles, and even our Saviour himself, by example, showed to their own and all succeeding ages that honest labour was honourable. There can be no question that some occupations are more honourable than others; and every man who endeavours to rise in life does well. Far be it from me to speak lightly of social rank; but I cannot shut my eyes to the fact that in the present day there are amongst us some who set up false standards of respectability—who look down with a stupid, ignorant contempt upon the lower or industrial classes. I am not sure that the ability to produce wealth is not as respectable as its mere possession. I am not sure that honest labour is not as respectable, and as honourable too, as luxurious indolence. I would not confound those who, raised by the industry of their fathers or forefathers above the necessity of toiling for themselves, devote their lives to honourable and useful pursuits; but I mean a class with whom the moving, acting, working world has no sympathy, and which laughs at the miserable, shrivelled gentility which prides itself upon having had nothing to do with trade, and can never embark in any pursuit for the benefit of their fellow-creatures which might bring them in contact with anything so degrading as manual or mercantile industry. These idlers of society are not, however, to be confounded with those of the upper classes who devote their time to honourable and useful pursuits--happily for this country, a class that is becoming more and more numerous. Yes, if you want to find the real "friends of the people," you must not look for them among those who proclaim themselves such, but among the long list of honourable, distinguished men who are always ready, with time and money, to help forward any project having in view "the health, the wealth, the happiness of the working classes." One word in conclusion. If the working men would rise to a position of greater respectability and influence in this country, they can do so by becoming more intelligent. We are approaching a time when men will be respected according to their knowledge and conduct; and nothing can prevent you from becoming more powerful than you already are, but from remaining less intelligent than the classes above you. A long line of distinguished men has sprung up from your ranks—men whom any class might be proud to rank among their number. Watt, a mechanic, gave us the steam engine; Stephenson, a pitman, gave us the railway. Here are two men, sprung from your ranks, who have done more for trade, and towards developing the resources of this country, than all the mechanical men who ever lived. And have you no men to boast of, who have conferred benefits on mankind of a higher order? Look through the pages of the *British Workman*; and you will be proud of what the world owes to working men. I could enumerate them, but will only remind you of one—a name which will live as long as time lasts; a man of whom the working men of Bedford may feel justly proud, and whose works they will do well to study. I mean the immortal John Bunyan. May you follow in the footsteps of that noble man, and at last, when the labour of life has terminated, enter into rest!

AN ENGLISH FARMER IN FRANCE.

SIR,—My last letter, on the growth of beet for sugar, has rather interrupted my narrative; but I thought it so interesting a subject to your readers, I could not forbear sending it.

Having seen the town of Dunkirk, the country next became of course the object of attraction. As the population is a trifle under 30,000, half a mile from the centre brings you to any one of the nine gates, at each of which is an "octroi" office, and a couple of men to attend to it. I thought, perhaps, they might have asked me for my passport; but, no, that is one of the duties of the *gendarmes*; but I believe you may travel from one end of France to the other, without being requested to show it, unless you stop more than one night at the same hotel.

Directly you are outside the fortifications it is the country; and I will endeavour to describe my first *coup d'œil* of a foreign landscape, to me a most interesting moment.

A straight and well-paved road and footpath; a row of stunted elms on one side, and willows on the other; a canal running parallel (the earth excavated in the making it having evidently been used to raise the road some feet higher than the adjoining land); half-a-dozen windmills and some small white houses with only a ground floor and a garret under the pantile roof; the land dotted with fruit trees, and divided into small market gardens by narrow hedges full of willows polled; and here you have the view.

At the moment, two fine barges were passing, loaded with coals from Belgium. They had a sail each, but the first was assisted by three men and a woman, at the end of a long tow rope, and both were guided by a woman at each helm.

'Twas market-day at Bergue, another old fortified frontier town, 4½ miles distant; so I walked there. As I proceeded, I was indeed surprised at the surpassing richness of the soil. Round Dunkirk it is a blackish sandy loam, which varies throughout this splendid district of 100 miles south (and I am told over Belgium and Holland), in all the gradations of colour and cohesiveness of loam, with a top-soil of a yard in depth, and a subsoil of brick-earth and marl, requiring no foot on the tool which digs it. We have land as fine in England, but certainly not in such a continuous length.

The cultivation is most excellent; leveller, straighter, or deeper ploughing I never saw, and executed with a pair of horses in a most primitive drap plough, so short in beam and handles that, had I not seen it, I never could have believed it possible to have produced such superior work. They go quite close to the ditch, and the few inches left they dig; so not an inch is lost. The land is all as clean as a garden: even the old hedges are hoed; and we certainly might with advantage copy their mode of making them. All is alive. The stakes are nine inches apart, three feet high; and the plashes, at an angle of forty-five degrees, are all tied with a small willow twig at every place where they cross the stakes, the whole being eithered at top, and that also tied to every stake in same manner. It is often not more than three inches diameter, and is the neatest hedge I ever saw, quite impervious to pigs and sheep, and well adapted to arable land. Some may fancy the labour of it expensive, but I think not more so than ours. It is sometimes quick, but often elm; the seed of which is sown to procure the plants, which are inserted in a single row.

Some grass orchards I have seen enclosed with a live hedge, six or seven feet high, of hornbeam, as large as your arm or leg, a very few inches apart, and the branches interwoven and tied, as the other; it is a fence for a lion, and, like the other, taking but a little space: both these are worthy of imitation.

One hundred acres are here considered a good-sized farm: many are owned by the occupiers.

I gave you, in a few lines back, my first view of this immense vale; I will now, having penetrated some miles into it, endeavour to depict its general appearance.

I expected to find the country have a very dotted appearance, from its numerous subdivisions among small owners; but it is not so, the marks being small square stones, half buried, and no "grass baulks" being left; and all now being ploughed for wheat or spring crops, I could often fancy myself in a level parish in England, under the (recently altered) old "common-land" system. The land has the appearance of immense ploughed fields, with occasionally smaller ones, of the richest grass, nearly all water-meadows, the ditches on both sides being thickly planted with willows. Sometimes apparently unmeaning rows of tall branchless wych elms are seen, and always on the sides of accommodation-roads to the farms, and now and then in square clumps, like Indian topes, giving an appearance in the distance of a wooded district, which it is not. Windmills, barns standing singly, small round ricks of corn, cottages and square-enclosed farmyards—all combine to make a pleasing landscape, for a flat one. You may consider this a picture of the whole country.

They were wheat-sowing, and I saw one harrow drawn by two men, which may give you some idea of the tenderness of the soil. They are excellent seedsmen, seldom drilling the wheat, but generally sowing five pecks an acre, and ploughing it in with one horse. It lies usually in large lands, and the smaller pieces seem often to have been ploughed many times one way, so that no furrow is seen, and all slopes from centre to the boundary. What furrows they have they seem carefully to "spit" out. I suppose they are anxious to get rid of snow and rain-water quickly; but too much of that I have never seen, for I am sure many five months of summer are much wetter than the last five we have had here. Their course of husbandry is—betteraves; wheat; oats; clover, mowed often three times; bitteraves; wheat; oats; then perhaps potatoes or colza for seed, or beans; and then wheat for last. The wheat is harrowed and well-rolled in spring; cut with a bagging hook, shocked with a hood sheaf, and harvested as it ought to be, from what I saw of the dry samples of white wheat in the markets (brown is not much grown). It is thrashed with a flail, and sold by the hectolitre, *i. e.*, 200 pints, worth now about 16s. 8d., *i. e.*, 5s. 6d. per bushel; bread and gin being the only cheap things here. The former is three pounds for 3½d. Straw delivered is worth 5d. per truss.

The oats are generally white, and are harvested in the same manner; and of them the only thing worthy of remark is, the very small quantity of seed they give to them: they are worth about 3s. 6d. a bushel; they grow great crops.

The clover they make like corn. They tie them in little bundles, and set them up like corn sheaves; consequently it is all woefully made too much, put in little stacks, and when sold at £3 10s. a load is delivered in these same bundles, weighing 9 lbs. each, without a tilt; consequently, if delivered in damp weather, not worth much after a fortnight's housing in a hay-loft. Their hay is made much as ours; and did they not stack and deliver it in the same ridiculous way as the clover, it would be of excellent quality: they are both the same price. Extraordinary that these capital farmers should not have copied our admirable manner of stacking and trussing hay! I should fancy they grow large crops of clover, as I saw many pieces being cut, for soiling the cows and horses, the third time, at the rate of a load an acre. This, of course, is never made into hay.

The colza is sown in beds in the latter end of July, and transplanted (in land manured) in October, in rows across four-step lands, one foot from row to row and four inches in the row. It is cut in July: a good crop is thirty bushels an acre of seed, worth 6s. per bushel. The land is generally immediately ploughed, and sown with white turnips (like our six-weeks' turnips), which come off in time for wheat. The disease of the potatoes has troubled them like us, but I think not to the same extent. It has for some five years past been gradually becoming less; they grow about ten tons an acre; the best worth £3 5s. per ton. Peas they seldom grow. Beans they do occasionally, which they principally give the fatting hogs. Barley is little sown in this district.

You see their prices are about the same as ours, so that with the advantage also of the betteraves, I do not think an English farmer could extract more gross return per acre than they do; and this, added to the heavy stock of cattle they keep, which being fed on bought food has almost no limit but the pocket, make a small farm here a good living. They are a most frugal race, and their great ambition is to save and invest their accumulations in the purchase of land, which fetches an enormous price. A highly-respectable notary informed me 2½ per cent. was considered a fair return. A very great proportion farm their own property.

Leases generally extend to nine years. They have not restrictions in cultivation like us, and the repairs are generally done by the landlord, the farmer providing food the while for the men; but all here is so solidly built of brick and stone, that the repairs are trifling. The barn and stable-doors being all arched, look like the buildings attached to an old monastery or castle, more than an isolated little farm of the nineteenth century. They certainly are a contented happy people, and most industrious. On market-days the son or father, generally both, with mother or sisters, take their covered waggon of corn themselves; pitch it in the market-place, and, when sold, return in the same manner, the exact quantity and price being taken by a policeman and signed by the seller. I never saw such exact statistics as are taken here by Government in everything. I fancy it will be interesting just now, as the question of agricultural returns is so much agitated in England, if I some time send you an account of the progress here made therein, and their manner of doing it; but I am trespassing on your space. My walk to Bergue I will finish in my next, with their cattle management, and the extraordinary but very general treatment of the pleuro-pneumonia.

After a few days' stay at the principal hotel at Dunkirk at the moderate expense of seven shillings per day, I took the rail for Lille.

This is the northern railway running from Dunkirk and Calais to Paris, the Belgian lines running into it. It is a most profitable affair. The carriages are better than ours: first class more silkily lined, and more softly stuffed, and with hot water tanks for the feet; the second also have cushions and stuffed backs; and the third are exactly like our second. The pace is very slow—fifteen to twenty miles an hour; but the price is cheap—first class for fifty miles 6s. 10d.; 66lbs. of luggage is allowed each passenger; all above is charged, but very moderately. The grass grows between the rails, the station-houses are inexpensive, and all seems done cheaply for profit. The crossings were all on the flat (no bridges), with a cottage at each for the *woman* who has care of it. She stands with her folded flag extended in her right hand, as you pass, with a uniform—black glazed hat, white cap, blue cape, and wide red collar. Nothing more is worthy of remark but the fences: they are the same all the way, made of oak *laths*, about a yard high, upright, four inches apart, with two longer ones tied together along the top; and at every five feet an oak post, of which a pole of six or eight inches diameter would make four, the whole being tied together by three *double rails* (if I may so call them) of iron wire, which are twisted round each lath the whole way, and the two tie-laths on the top are served the same. It is stronger than you would fancy, has stood seventeen years, and with new posts will stand many longer. It is good against sheep and hogs, and might often be economically applied at home—a good protection to a young quick near a farmyard. The same sort of landscape prevails the whole way (as I have described it), with the exception of some rising ground about Cassell (half way). I saw two or three small hop grounds, on ridges much narrower and higher than ours; but I will describe their manner of management at the same time as I speak of their malt and beer.

A long delay took place at Calais junction, waiting for the London train, during which time I was much amused at the *sang froid* of a Zouave in a first class carriage; a little sallow man in yellow leather leggings, blue breeches large enough for three, embroidered jacket, and red cloth cap—in Algeria they put on it the white cloth, which makes it a turban: you might readily fancy him a Turk. The reason he was in a first class is, all soldiers and officers here have the *entrée* of railways and theatres for *one-fourth* the price of other people—a great advantage to the rank and file of the infantry, who have only a halfpenny per day. This is the fact; and very happy and content they are. Of course all necessaries are found them; and I am not at all astonished at their predilection for military life: they have little to do.

In time I arrived at Lille, the principal manufacturing town in all France: its Manchester, with a population, including a radius of two miles, of 300,000. It is surrounded with windmills. There is a spot from which you may count 200. I have counted fifty in sight at once frequently. Some are for oil. Few Englishmen stop here, as all haste on to Paris; but it is worth a couple of days to the tourist. About 400 English are here resident, mostly operatives. Very few speak English, none much; but in a few years that will be altered, as now it is taught at all the public schools, to which *all go*. A better education may be had here for *one shilling a week* than in many parts of England for £1. Every boy has to undergo examination, and all are taught mathematics.

All seem thriving here under the strictest system of protection. No one has any fondness for free trade. Government manages everything. You cannot set up a business without leave from the mayor. They are very jealous of us, as we either undersell or outdo them in everything. Anything English is valued. How many times I have been asked if English razors are very dear, as they are so superior to French! Many wealthy men are here. Money is worshipped as much as in England; more so, for those who have it keep it. You do not find the noble examples of self earned fortunes spent like princes, and in doing good as we do at home.

Last Tuesday was held here the yearly cattle show of eight surrounding departments, viz., Novd, Calais, Somme, Aisne, Oise, Seine-et-Oise, Marne, Seine; and it is considered a very important meeting. The abattoir in which the cattle were shown was ornamented with a profusion of tri-coloured flags, and a pavilion was erected for the notabilities who distributed the 38 prizes, which amounted to £342. Agriculture is particularly patronized by the Government; all is done to assist it; and at the introduction of a new plant, or manufacture connected with it, it is not unusual for the public money to be lent to the farmers to try it, as was done many years ago at the introduction of the *betterave* for sugar (by-the-bye, there is a new plant, called *sorgho*, likely in some parts to supersede the *raves*: I will send you a succinct account of it shortly).

The number of bullocks exhibited were 80, cows 41, calves 10, sheep 15 lots, pigs 27. The first class were sixteen Flemish beasts, from two to three years old. They are very useful animals; dark red; much like a coarse Devon or Sussex. They had evidently been well managed, from their size—generally 14 hands, and one 15 nearly—and not so *very* long in the leg. Not very fat—fat animals are not relished here, as, from their mode of cooking, the fat does not come to table: all is boiled or *baked* to rags; nothing like our English cooking. As to a good floury potato, no one knows what it is.

The first class had three prizes of £28, £24, and £20, and two were "honourably mentioned."

The next lot in same class were 12 more, same breed, from 3 to 4 years old; they also had three prizes of £28, £24, and £20.

The second class consisted of three lots. The first were Flemish bullocks, without reference to age; these had three prizes of £16, £12, and £8. The second lot were six Courtois bullocks (a place near the Swiss frontier), a very cloddy animal; but they seem to have many breeds there. Prize 1, of £16, was something like a very coarse Ayrshire; the second prize, of £12, more like a Hereford; and the honourably mentioned was a little thick dun bullock, like a bad Highlander.

The third lot were 27 of all breeds: many were crossed with Durham. Prize 1, of £16, was like a leggy York, with roach back; prize 2, was £12; and prize 3, £8—in my opinion, the best half-bred English of the lot.

The 41 cows were better than the bullocks: I may say they were excellent. The first prize, of £12, was thorough-bred English (of course bred in France, the property of the Marquis of Verdun, of D'Ancy Manche, in Normandy); not large, but very neat; her *live* weight was 230 stone; that would be about 150 stone dead. He sold her for £55 to a butcher, who expected to get a prize with her at a Show at Bergues this week. Second prize, of £10, was an English roan; very good also. Third, of £9, was a Dutch cow; fourth, of £8, was half-English and Flemish—very neat, but small; fifth, of £7; sixth, of £6; seventh, of £5 10s.; eighth, of £5; ninth, of £4 10s.; tenth, of £4; and some honourably mentioned. I would not wish for 41 more useful cows.

The fourth lot were 27 cattle, in droves of four and five each. Many of these were a distant breed (I believe, Courtois), very thick and heavy, 13½ hands high (I like to speak within bounds). There was only one prize of £20 in this lot, and that was given to five yellow dun bullocks between five and six years old, which had evidently been worked; and handsome they looked, no doubt, in their harness. There was not a single polled cow or beast, and they were all trimmed; the latter was a pity.

Ten fat calves come next in the list, generally Dutch bred, from 11 weeks to 3½ months old; nothing particularly good. There were two prizes of £6 and £4.

The sheep were divided into two classes: 1st, young sheep, without reference to breed. The first prize of £16 was for a lot of half-bred Flemish and half-bred Down yearlings; second of £12, for a lot of 14 months old same breed; third of £8, for some 1 month old do. All had their tails bobbed short, and were shorn: the last lot cut 10lbs. wool each (10d. per lb.), and would weigh 11 stone each. The 2nd class was divided into two lots; one without restrictions, and the other merino or half-merinos. The first prize of £12 was for some three-year-old half-bred Flemish and Leicester very big heavy sheep; the second, of £8, for some same breed two-years old; and the third of £4 for half-Flemish half-Down. They told me the wool of the Down cross was worth more than the Leicester cross.

The merinos and half-breds were enormously fat; I never saw fatter. There was only one prize of £12, and that was given to half-merino half-Leicester. This wool does not fetch the highest price. I shall know the live and dead weight, all in one of these lots.

Pigs were good. Short-legged, hardy, white hogs, two prizes of £4 and £3 were given in class 1 (all French breed), and three of £4, £3, and £2 in class 2 for cross-breeds. This concludes the list of cattle.

At 3 o'clock the Prefect of the Department, the Inspector-General of Agriculture from Paris, the Mayor of Lille, their secretaries, and others, all in diplomatic blue uniforms, cocked hats, and swords, took their seats under the Pavilion, while the brass band of 1st Dragoons amused the crowd. The Prefect began by congratulating the people on the progress they had made in agriculture in the north, combining it with manufactures, by feeding the cattle on their refuse, making Lille an especial place of attraction to all who had an interest in land. He thanked all who had assisted, and the many who had come from distant parts to do honour to the meeting. The Government was anxious to give every encouragement possible to agriculture. "The Emperor applies himself energetically and at all times to the agriculture of France: to raise it to the utmost of his power was his most earnest desire. He depends on you to assist him in this good work, and in that hope I am happy to join you in exclaiming 'Vive L'Empereur.'" The Inspector-General then rose, and in the name of the Government and the judges of the show begged to bear witness to the improvement every year made in the agriculture of the north of France.

The recipients of the prizes were nearly all farmers, and in appearance respectable men, about the same as our 200-acred tenants at home; but in their homes what a difference! what a life of discomfort, compared to the same men in England! I have been to two of their houses, and shall go to a third next week (one of the strongest tobacco-growers about here), to which I shall devote my next letter, and will now conclude.

AN ENGLISH FARMER IN FRANCE.

Lille, March 29, 1858.

THE VALUE OF FURZE AS FOOD FOR CATTLE.

The following are extracts from the testimonies of respectable agriculturists; addressed to the editor of the "Cork Daily Reporter":

From Rev. Benjamin Williamson, Old Dromore, Mallow—"I have been using furze for horses these last three or four years, cut with a chaff-cutter. I commenced this winter on the fourth of October, and am feeding *all* my horses, for pleasure and otherwise, to the number of twelve, and a yearling from that time to the present, and hope to continue doing so for another month. They get nothing else, and are in capital condition. One of the riding horses is rather too fat. I have two furze meadows, each about two acres, and have cut every second year hitherto; but in future I mean to cut every year, as the second year it becomes woody. The land on which the furze is grown is very poor, not worth more than 7s. Of course the richer the land the heavier the crop. I am cutting some two years old for litter, and think of sowing another field this year for that purpose. Sow with barley or oats under the harrow, about 15 lb. to the statute acre. A donkey can work the chaff-cutter without bruising, which with young furze is not necessary. By hand-labour (though mine is inferior to Richmond and Chandler's £10 cutter which I intend purchasing) two men and a boy feeding will cut in an hour sufficient for twelve horses. Four hands working got four firkins (equal to bushels), a little packed at night, and no hay. There is a good deal of grass growing with the furze, which is much relished. The other horses don't get so much, but always get a couple of gallons mixed with their oats, which makes them masticate the latter better. The furze is mown daily with an ordinary scythe. The first crop I sowed without corn, but gained nothing by the sacrifice, as it is very slow of growth the season it is sown, not more than a couple of inches in length."

Richard Barter, Esq., M.D., St. Anne's, Blarney—I have been using furze for nearly twenty years, I prepare with a chaff-cutter, I have five farms, and in all have water-power. The furze is cut very green, with a scythe, every year. It is far superior to hay for cows and horses, and the yield of inferior land is superior to the best meadow."

William Crooke, Esq., J.P., Derrun, Coachford—"My mind is made up, after more than twenty years' experience, that furze is the most valuable forage plant we possess in scarce seasons. Farmers from great distances come here to buy furze by the half-acre, at high prices, which they could so easily grow on their own farms. The lowest price I ever got was £4 per acre (statute), which was not half its value. My plan of culture—sow 28lb. of seed to each acre, as you would clover seed in oaten tillage the day after sowing the corn; the oats will not injure the furze, nor the furze the oats in mowing, unless the oats be a very heavy crop, and should lodge, in which case it is sure to kill the furze. You will have a great crop every succeeding year—say from four to eight tons. On no account let it stand more than a year uncut; it gets woody and bad for food. No beast should be allowed in the field at any time, except that which draws in to the farm yard. It requires no manure, no weeding, and mine is yielding abundantly, after more than twenty years' constant mowing. After many years' experience, cutting every year, it has been rising every year in my estimation. Good as it is for food, it is equally good for litter. I have found that furze passed through the cattle-house is just as good manure as if wheaten straw had been used. For food it must be used fresh: it will not keep cut and bruised a second day; any left ought to be swept into the manure pit. Water-power works a powerful cutting machine, bought from M'Kenzie, Cork; works also a Gardner's turnip-cutter, and it is astonishing in how short a time turnips and furze are prepared for twenty head of cattle."

Mr. Hawkes, Passage West, adopted Mr. Crooke's plan of cultivating and preparing furze, and found it to be of the greatest advantage in supporting cows and horses. This year the herdsman varied the food with great advantage, giving half furze with some turnips and hay, and never had them in such a condition before.

Mr. Samuel Lane, steward to the Hon. Mrs. Austen, Hadwell, Aghada, writes that he has had many years' practical experience of its great utility as food for horses and horned cattle, and its value as a substitute for hay. He had for many years the superintendence of two large farms; and on one he worked on his own account, furze propagated by plants from seed in previous spring, in November, and mown every year, turned to best account. Poor light or mountain land, which would be useless for other crops, will bring good furze, by ploughing and digging, sowing 20lbs. seed to the acre. Any farmer so devoting five acres of poor land would find that they were the most valuable and useful part of his land. His way of preparing was, first the cutting spade and pounder; but in 1854 he bought a furze cutter from, as he truly says, that first-rate seedsman and machine-maker Mr. Thomas M'Kenzie, Camden-quay, Cork, for eight guineas.

Six horses, one mule, four working bullocks, and twenty heifers, were supplied every day. The horses got three firkins well filled every day; the mule two; working bullocks three each; heifers one each; a few firkins to the milk cows; working horses and working bullocks got a little hay also. One man and a boy provided and prepared all this food.

ACCIDENTS CAUSED BY AGRICULTURAL MACHINES.

It is but a short time since machines propelled by horse, water, or steam power have been employed to any great extent by farmers in this, or in fact any other country, the great proportion of the labour bestowed on land, and nearly all the work of the whole farm, being performed by manual labour, or the direct traction of draught animals. With the advent of the application of machinery have come the dangers resulting from its use, involving the loss of life and limbs to its operators. These accidents can, however, be prevented to a very great extent, by care and prudence. When machinery was first extensively used in manufactures, accidents were of every-day occurrence. Limbs were cut and torn from the body, and even the whole frame mangled in the worst manner. But at the present time such agonizing scenes seldom occur, and when one does happen, it is often in using some new machine with which the workmen are unacquainted, or, what is more generally the case, the victim is a new hand, often a few hours only since he first entered the building. Now from these facts we may understand that the principal cause of such accidents is either carelessness, or ignorance of the dangers resulting from the use of machinery. At the present time, machinery for manufacturing purposes is built with reference to obviating any danger which might arise from its use. Wheels are guarded and belts placed in positions least liable to come in contact with the dress or persons of those in attendance, or in many cases entirely boxed in; and in all well-regulated factories, every precaution is taken by which life and limb can be protected. The workman also has a set of rules by which he is guided in all necessary handling of his tools or machine, and the young beginner, who is not wise enough to profit by the experience of his seniors, soon learns a lesson which he will never forget, impressed upon him as it has been in blood.

Our farmers are at present in the condition of the manufacturing operatives of twenty-five or thirty years ago, in as far as ignorance of the manipulations of machinery, and they have to learn in the same manner those have done. But much of the experience of the latter class can be profitably applied by the former, and with great ease. We will give a few hints on this subject, which will be found of practical utility.

1. Greater care should be taken in handling machines driven by horse power than is necessary when steam or water power is used, the motive power in the former case being more liable to start when not wanted, and that in either direction. The animal should therefore either be detached, or the machine locked when it becomes necessary to handle the working parts. With a properly constructed steam engine or water power, this is never, or at least seldom the case.

2. In putting on or taking off belts, be sure and have your feet firm. Never put your thumb or fingers between the belt and the pulley. The safe handling of belts cannot be performed by a mere novice; practice is always essential.

3. Never pass before a mowing machine to put anything to rights. If you stand at the back or upon the machine itself, there is little danger, otherwise much; as several serious and fatal accidents during the past season give evidence.

4. Study the details of all your machinery with an eye to the liability of danger to yourself or servant, and devise means by which it can be avoided, and you will confer a benefit on the whole farming community.

5. Give preference to machinery that, combined with other good qualities, is constructed with reference to the avoiding of injury to the person who has it in charge. Along with the observance of this advice, never allow a person under the influence of liquor to come near any kind of machinery. The whisky jug is often the cause of much suffering in this way as well as in others. If the reader will remember these hints, they may prevent many sad accidents.

"GOD SAVE THE PLOUGH."

BY MRS. SIGOURNEY.

See how the glittering share
Makes earth's bosom fair,
  Crowning the brow;
Bread in its furrow springs,
Health and repose it brings,
Treasures that mock at kings—
  God save the plough!

Look to the warrior's blade,
While o'er the crimson'd glade
  Hate breathes its vow—
Wrath it unsheathing wakes,
Love at its flashing quakes,
Weeping and woe it makes—
  God save the plough!

Ships o'er the ocean ride,
Storm wrecks their banner'd pride,
  Waves whelm their prow—
While the untroubled wain
Garneth the golden grain,
Gladdening the reaper train—
  God save the plough!

Who are the truly great?
Minions of pomp and state,
  Where the crowd bow?
Give us hard hands and free—
Cultures of field and tree—
True sons of liberty—
  God save the plough!

THE AGRICULTURAL VALUE AND USES OF LIME AND MARL.

Among mineral manures none are more highly valued than lime and its variods admixtures with marl and other earthy substances. That lime furnishes any absolute nutrition to the plant is extremely doubtful, as very few traces of it are ever found in analyzing the different kinds of vegetables. Its great advantages as a fertilizer appear to be almost entirely derived from its chemical action on various ingredients, and in a certain mechanical influence which often acts favourably in improving the texture of the soil. In order to use lime with any degree of certainty as to its effects, a partial knowledge of its chemical and mechanical uses is absolutely necessary. It is obvious to all, that this substance on different farms produces the most contrary effects. While, used with discretion, on some soils it produces the most astonishing results, it is known to be attended with really ruinous effects when applied to marly and calcareous soils, without they have previously been very much reduced, in which case lime can be applied in small quantities in conjunction with other manures. Lime is used with the greatest advantage on peaty soils, and those which contain a large amount of vegetable matter—clayey soils, which need to be acted on by its mechanical effects, in rendering them more light, open, and easily cultivated—soils which are barren by the existence of green copperas (proto-sulphate of iron)—those which need potash, and, as a general rule, most soils which are sterile and worn out from long and exhausting systems of cultivation.

Marl varies very much in its composition in different localities, but is generally known as a mixture of various kinds of earth with lime; and its value is chiefly estimated by the amount of this mineral which it contains—hence we have clayey, sandy, and earthy marls. Although owing its fertilizing qualities mostly to its per-centage of lime, its other ingredients are often highly valuable, especially when applied to opposite formations of soil. Thus sandy marl would prove the best of fertilizers for stiff clay. In England the value of marl has long been recognized, and we are informed that leases were granted as far back as the reign of Edward I. which compelled the tenants to make use of it, but its use is much less employed since lime has become more known.

The farmers at one time were so confident of its virtues, that they depended almost entirely on it, and made it supersede the use of dung, by which means they were enabled to sell large quantities of hay and straw. But this course, although it enabled them for a time to raise good crops, eventually reduced the soil, and thus has arisen the old saying which was cited by Barnaby Goorge, who wrote so long ago as the middle of the sixteenth century, that "*lime and marl are good for the father, but bad for the son.*" But this saying, like many others of ancient date, is evidently an error when they are judiciously employed in connection with animal and vegetable manures.

As the value of marl is computed by the quantity of lime which it possesses, that value can be roughly ascertained by the effervescence which ensues when vinegar or muriatic acid is poured on it, after which a chemical analysis, if deemed expedient, would show the exact per-centage of this and all other ingredients. When a bed of marl is first found, and no good reasons are given for its use, farmers should be careful to use it first in small quantities, and thus experiment with it until they are perfectly satisfied of its real worth. In order to get poor land into a good state of productiveness by lime and marl, it is also necessary to manure highly with animal and vegetable fertilizers, such as stable manures. But where it is impossible from the scarcity of these manures to bring it up in this way, the cheaper but slower process of ploughing-under green crops can be resorted to with almost equal success. Clover is perhaps the best crop to turn under, when the land is in good heart enough to produce it; but when too poor for its production, buckwheat can always be relied on until the soil is sufficiently replenished for the growth of clover or lucern.

Farmers possessing fertile land must be aware, by what has been previously said, that if they find the use of lime or marl beneficial to their crops, they must not rely too implicity on this class of (mineral) fertilizers, but rather increase than diminish the amount of farm-yard manures; for the increase of the crops which is produced by liming rather tends to exhaust the soil of its necessary ingredients, and to destroy its fertility; so that while the use of lime is continued, it becomes more than ever important not to decrease the use of other manures. All this extra labour and expense bestowed on this system of cultivation will be doubly repaying; for if there is any profit in raising medium crops on a farm, this profit rapidly swells when the same land is made to produce large and abundant returns.

Most marls need to be drawn out and exposed to the action of the weather for some months before it is intended to use them, that they may be pulverized and made suitable for application by the action of the weather. Some kinds are so stiff and unmanageable, as to need the action of both the summer and winter elements to reduce them to a proper state of fineness for application.

Lime should not be applied in its caustic state, except to lands containing large quantities of inactive vegetable matter, and on those in which organic manure is contained unchanged and ineffective. When partially slacked and reduced to fineness by exposure to the air, it possesses sufficient caustic properties for all other soils, if applied soon after being slacked. Mild lime, after being reduced to a powder, is more beneficial to all lands, with the exception of the above, as it does not exhaust the vegetable matter in any greater quantity than is required for the growth of the crop. The trifling saving which might be gained by the immediate application of caustic lime would never pay for its injurious effects on all soils, excepting those which contain large quantities of organic matters requiring to be dissipated. Besides, caustic lime should not be used in contact with seeds or herbage; and when applied to clays for the purpose of improving the texture of the soil, it frequently causes quite the contrary effect, as it unites in a mortar with the clay, causing it to harden and form cakes. In most all cases, we think it is self-evident that lime should be applied after air-slacking, in its mild (carbonated) form.

We are frequently asked whether lime will benefit soils associated with limestone rocks. Such soils frequently contain lime in sufficient quantities; but this is not invariably the case, as soils sometimes resting on limestone, or abounding in loose limestone and shells, are frequently devoid of lime in such a form as to be useful. We can only account for this phenomenon by supposing that the soil was originally derived from some other source than these rocks, or that the firm texture of them has prevented their crumbling enough to benefit the land. Thus it often proves that liming is beneficial on what is called limestone land. We should advise its use in small quantities at first on such lands, without the owner is perfectly satisfied by analysis that his land is totally deficient. By pouring muriatic acid or vinegar on a small portion, he can at least tell if it contains lime to any considerable degree.—G. T. H. in the "Country Gentleman."

SEA-WEED.

This is a valuable manure for almost any description of soil, from the light sands to the heavy and viscid clays. No one, who has experienced the beneficial results attending its application, will doubt its value, especially when applied as a top-dressing to lands in grass. The most proper season for removing and spreading it, we are informed by those accustomed to its use, is immediately after haying; or if it cannot be conveniently done at that time, the work may be deferred till after harvest. It is a judicious plan to mix this weed with loam or muck, forming it into a sort of compost. The mass should be frequently turned. If convenient, ashes, lime, plaster, and clay may be added, depending considerably upon what kind of soil the mass is to be applied to; but it should not be permitted to decay in a heap by itself, as in this case the limited amount of fibrous or ligneous substance contained in the mass causes it to decompose almost "to nothing"—a slight residuum only being left after decomposition, and this of a very weak character, and not, perhaps, of sufficient value to warrant its application to the soil.

Muscle shells, and the rich, unctuous and viscid sand abounding along the coasts and on the shores of creeks, are other important and valuable elements of fertility, and when spread upon soils of every description, produce highly beneficial results. This sand is composed principally of animal and vegetable substances, intermixed with the exuvia of testaceous and crustaceous insects, saline particles, and an extremely fine sedimentary substance deposited by the waters of the ocean, together with carbonate and hydrate of lime, animal matter, and earth. The intermixing of these several substances constitutes that highly efficient fertilizing mass denominated sea mud, or "flats."

When a farmer can obtain a sufficiency of this article with which to dress his lands, he need not fear the failure of his crops for lack of manure. Sea-weed, and sea mud, or "flats," constitute an excellent substitute for animal excrement and compost, and almost supersede the necessity of the latter, in ordinary husbandry. If the weeds and mud should be taken out after haying, and placed in the barn or compost yard, with common muck, mould, and vegetable matters of a succulent and perishable character, or thrown into heaps with forest leaves, straw, weeds, &c., it would decompose, and by the next spring furnish an invigorating manure for every description of crop.

There is abundant testimony of the value of sea-weed as a manure, in the books. Many years ago, the Highland and Agricultural Society of Scotland charged an intelligent committee with the labour of investigating its composition and value, and their report is highly favourable. Dr. Holland, in his "Survey of Cheshire," says, "The ground thus manured not only gives a larger produce of potatoes, but is in a state of excellent preparation for a succeeding crop of either wheat or barley." In a work by the Rev. Philip Falle, upon the island of Jersey, whence we obtain the famous Jersey cattle, he says that "Nature having denied us the benefit of chalk, lime and marl, has supplied us with what fully answers the end of them in husbandry—it is a sea-weed, but a weed more valuable to us than the choicest plant that grows in our gardens. * * * Being spread thin on the green turf, and afterwards buried in furrows by the plough, it is incredible how, with its fat unctuous substance, it ameliorates the ground, imbibing itself into it, softening the clod, and keeping the root of the corn moist during the most parching heats of summer."

We are aware that our friends on the sea-shore, who have access to this plant, value it highly. We suggest whether it has not sufficient value to justify its being collected away from our immediate shores, and landed up the creeks, and in such places as to bring it into the vicinity of a large extent of farming country.

THRASHING MACHINES.

The monthly meeting of the members of the Highland and Agricultural Society of Scotland was held on Wednesday, the 24th March, 1858. The Right Hon. Sir John M'Neil, K.C.B., in the chair.

Mr. Hope, Fenton Barns, said—In introducing this subject, perhaps a slight sketch of their history might not be uninteresting, particularly as it enables us to review the progress that has been made in mechanical science, the great saving of labour, both human and animal, that has been effected, and the large additional quantity of food produced, by the more perfect manner in which grain is now separated from the straw. In early times this separation was performed by laying down the straw with full ears in a narrow circle, named in holy writ "the thrashing floor," and treading it out with the feet of oxen. It was one of the benevolent edicts of the divinely commissioned Jewish Lawgiver. "Thou shalt not muzzel the ox when he treadeth out the corn." This method is still followed in Eastern countries; and even at the present day, as we learn from the latest authorities, in some of the States of America, a large proportion of the grain is trodden out by horses. With grain easily raised, and cheap in comparison to the wages of labour, and in hot and dry climates, which renders grain more easily shaken from the straw, this manner of performing the work may not be so unsuitable as might at first be supposed; still, under every circumstance, there must be great waste of the blessings of divine providence. It is believed that the Jews possessed instruments which may be described as thrashing machines; but these were only heavy pieces of wood, sometimes shod with flints, sometimes revolving cylinders or teethed wheels, and being dragged by the oxen over the grain, in a manner multiplied the number of their feet in contact with it, and, consequently, the work was done in less time. I believe it is not known when that simple implement the flail was first invented or used as a thrashing machine. It was well known to the ancient Romans, and at present is in general use throughout the continent of Europe. Even in some districts of England it is still a common implement on large farms, at least it was so before the repeal of the corn laws. In Scotland it has long been restricted to the Highland crofters. Early in the last century there are various accounts of attempts made to construct more complicated machines to save labour in beating out the grain. One, if not the first, of which there is any record, was by Mr. Michael Menzies, an Edinburgh advocate, who resided in East Lothian; his brother being proprietor of Letham, near Haddington, and also sheriff of the county from 1718 to 1725. A patent was obtained for Mr. Mensies' machine in 1732, and it was declared by the Society of Improvers in Scotland, "to be likely of great use to farmers, both in thrashing the grain clean from the straw, and in saving a great deal of labour." It was on the principle of driving a number of flails, which were made to revolve round a cylinder, by means of water power. But from the force with which it was wrought the flails were soon broken to pieces, and the invention proved a failure. Another thrashing machine was invented about 1758, by Mr. Michael Stirling, a farmer in the parish of Dumblane, Perthshire. This machine was similar to the flax scutching mills of the day. It has been described as a vertical shaft with 4 crossed arms enclosed in a cylindrical case 3½ feet high, and 8 feet diameter. Within this case the shaft and its arms were driven with considerable velocity. The sheaves of corn being let down gradually through an opening on the top of the box, the grain was beaten off by the arms, and pressed, with the straw, through an opening of the floor. The grain was separated from the straw by riddles shaken by the mill, and then cleaned by fanners, also driven by it. It was reckoned the great defect of this machine that it broke off the ears of barley and wheat instead of beating out the grain. It succeeded better with oats, and was used by Mr. Stirling himself, and also by some others for several years. It was driven either with water or cattle. A few years after Mr. Stirling's machine came into the partial use it attained, mills of a similar construction were introduced into Northumberland by Mr. Edward Gregson, only they were worked by hand power. Some time after this, or in 1772, Mr. Oxley erected a thrashing machine at Flodden, moved by horses. The corn was fed in betwixt two *fluted rollers*, and struck by switchers, placed at 3 inches distant, on the cross arms of an open drum: the scutchers were made of wood, and attached by leathern straps, or *hung on hinges*, as they were described. Thereafter, or in 1773, Mr. Ilderton erected two thrashing machines, one at Ilderton, and another at Hawkhill, both near Alnwick. They were worked by horses, and were made to rub the grain out by projecting pieces of wood (on the circumference of a large cylinder) rubbing against several fluted rollers. He used these machines many years, but it was frequently necessary to put the straw twice through before it was perfectly clean. Sir Francis Kinloch, of Gilmerton, who was a man esteemed, in his day, for his mechanical knowledge, had seen Mr. Ilderton's machine, and also the common flax mill. He endeavoured, by combining the two, to produce a workable machine. Sir Francis had a large model made; and as it could not be wrought by hand power, he sent it to Mr. Andrew Meikle. miller, and maker of barley and flour mills, at Houston Mill, Prestonkirk, that its effects might be ascertained by the water wheel of Mr. Meikle's barley mill; but in making the trial the model was torn to pieces, and a like fate befel a machine of full size, which Sir Francis erected a few years afterwards for one of his tenants, How far Mr, Meikle himself was indebted for his ultimate success to the sight and knowledge of Sir Francis' machines it is impossible to say. It is evident that approaches had been made by others to the principle which he was finally successful in carrying out, but none can deny him the high merit of being the first to construct a really serviceable machine. Sir Francis' efforts might have stimulated him; but it is well known that for years before, Mr. Meikle had made various attempts to construct a thrashing machine. There is a letter from six respectable farmers subjoined to the 2nd volume of *Wight's State of Scottish Husbandry*, published in 1778, describing a trial of one made by him on the principle of Mr. Menzie's machine, to which I have already alluded. His family possessed a hereditary right to genius and invention. It was his father, James Meikle, who went to Holland in 1710, in consequence of an agreement with the well known Fletcher of Salton. Meikle's object there was to learn the art of making pot barley, and also of erecting barley mills. He not only accomplished his design in a perfect manner, but after he returned, constructed the first fanners for winnowing grain that were ever seen in Scotland. However, to return to Andrew Meikle, he resolved to attempt thrashing by means of a rapidly revolving cylinder, with raised beaters parallel to its axis, standing out from its surface. This cylinder or drum was covered on the top by a concave surface, at some two or three inches distant from the circle described by the edges of these revolving beaters. A feeding board extended radially and horizontally outwards from the cylinder, and when near it terminated in two feeding-rollers, which revolving in towards one another, not only rapidly drew the straw forward, but held it from going too fast, which under the action of the beaters it would have been liable to do. The beaten straw, with the chaff and grain lying loose amongst it, was delivered on the floor behind the cylinder, and the operations of separation by fork, riddle, and fanners, were accomplished afterwards by hand. This is a description of the working model which he completed in 1785. It was driven by water, and first tried in that year at Knowe Mill, near Prestonkirk, a short distance from Houston Mill. It was found to do the work admirably, and completely answered his expectations. His son, George Meikle, being at Kilbegie, the residence of Mr. Stein, agreed to erect a machine, after the above-mentioned model, for that gentleman, upon condition of Mr. Stein furnishing all the materials and paying him for the work, "only in case the machine answered the desired purpose." This was agreed to, and the machine was completed in February 1786. It was found to work exceedingly well, and the only difference betwixt it and the original model was the substitution of fluted rollers for plain ones. Another was shortly thereafter erected for Mr. Selby, at Middleton, Northumberland. Mr. Meikle then applied for a patent, which, after some opposition, was granted in April 1788, for 14 years, and for England alone. Though Mr. Meikle obtained this patent he never acted on it, and when 10 years of it had expired, some of his friends stood forward and endeavoured to put it in force; but there was then such a number of erections by others that the design was abandoned. The late Sir John Sinclair, when President of the Board of Agriculture, strongly advocated Meikle's claims for a public reward as the inventor of the thrashing mill as then constructed. Through him and the Earl of Haddington a general meeting was held on 29th December, 1809, in the county town of Haddington, at which resolutions were unanimously passed, approving of Mr. Meikle's claims. A committee was formed, and subscriptions to the amount of £1500 obtained for behoof of Mr. Meikle and his family. After Meikle obtained his patent, thrashing machines were rapidly erected throughout Scotland and the north of England, with various improvements, such as mill fanners and rotating rake or rakes over circular frame-works for shakers. The invention of this shaker was claimed by Mr. Bailey of Chillingham, Northumberland. Much was done in the way of adding elevators and other improvements by a person in Kirckudbrightshire, but the machine itself and all the apparatus connected with it has continued almost until now in the same state that Meikle left it, for he readily seized and tried every alteration that occurred to himself or was suggested by others. Notwithstanding the total change of the moving power from sweating horses to the untiring and unvarying stroke of the steam-engine, the characteristics of a Scotch mill continue now in the same heavy drum, rotating rakes for shakers, and noisy wheels and pinions for putting the whole in motion. Dressing-fanners, in order to render the grain fit for the market, have been frequently added to the thrashing machine; but from the necessary irregularity in the quantity of grain thrashed per minute, and the difficulty of adjusting the fanners properly, complete success has been rarely attained. The best dressed grain I have ever seen done by machinery, and as thrashed on the beater principle, was on the farm of Mr. Hislop of Prestonpans. The grain as it came from the mill fanners was taken up by elevators, and then carried several feet by an Archimedean screw before it reached the dressing-fanners. This screw partly divides the grain and tends much to the delivery of a uniform quantity; again there are fixed across the hoppers of the fanners pieces of strong leather, which act like springs, opening when there is an additional quantity behind them, and contracting when the quantity diminishes. These simple but ingenious contrivances ensured, or very nearly so, the fanners having a steady and regular supply of grain at all times, and I believe it was mainly owing to this that the dressing was so perfect. When examining Mr. Hislop's barn machinery, I was particularly struck with the mode which he had adopted for carrying off the dust, and ventilating his barn. There was a large circular opening in the ridge of the roof, covered with a hood or cowl, which turned with the wind, the same in form and construction as those placed on the top of kilns for drying grain. The dust from the straw barn and chaff hole was conducted to it by means of thin boarding, enclosing a gradually narrowing space as it approached the aperture; of course, there was a large opening to it from the barn loft. It seemed to suit admirably, as the air was quite fresh and sweet, and on looking up to the hood out of doors, I was astonished to see the dust flying from it like thick smoke. This is the first and only instance of which I am aware of anything having been done to promote the health and comfort of the work-people when engaged in this often most disagreeable, if not actually unhealthy employment. I consider it alike creditable to Mr. Hislop's head and heart, and I mention it here in hopes that he may soon have many imitators.

Before the application of steam power to the thrashing machine, it never was practicable to do more than blow the chaff from the grain, and even that very imperfectly accomplished. The first thrashing mill driven by steam in Scotland, or I believe anywhere else, belonged to the late Mr. Aitchison of Drumore. At the close of the last century, he had got a steam engine put up by Bolton and Watt at his distillery at Clements Wells. It occurred to him that as the steam engine could do the work of the distillery, there was nothing to prevent it driving the thrashing mill. He accordingly had it attached, at what exact period I cannot say, but it was certainly previous to 1803. However, he was so doubtful or afraid that something would happen to prevent its continued use, that he kept up the horse wheel attached to the mill for several years. I am not aware of any steam engines having been erected, solely for the purpose of thrashing corn, previous to 1818, when the late Mr. Sked, Dunbar, put up one at Westfield, near Haddington, for Mr. Archd. Dunlop. Either in that or the following year, Mr. Sked erected other two—one for my late friend Mr. Reid, Drem; the other at Linplum. Thereafter, condensing engines were speedily to be seen on all large farms where there was a sufficient supply of water. It is singular that the engine at Drem, after 40 years' use, should look as well, and be as efficient, as the day it was erected. In 1834 and 1835, high-pressure engines came into vogue. In a few years they multiplied rapidly; and now there is scarcely a farm of 100 acres in extent that has not got its steam engine. It is almost impossible to over-estimate the benefits we derive from steam power; at least, I am confident that no man who has ever been in possession of an engine, would again submit to see his horses toiling and straining in the weary course of a thrashing mill. I believe we have not yet taken full advantage of this wonderful power. It has been simply attached to machines contrived for horse labour, but it is eminently fitted for instruments of a far higher class. At the end of the last century, thrashing mills were considered by agriculturists as the great invention of the age. The saving of manual labour of a most laborious description, the more perfect and expeditious way in which the grain was separated from the straw, and the facilities they afforded for managing large farms, certainly entitled them to be so considered. But notwithstanding the great advantage we derive from the possession of steam power for propelling them, and the length of time that has elapsed since their first invention and general introduction, few will deny that there is a strong feeling of dissatisfaction at the way in which a great proportion of the machines in use perform their work. It seldom requires any great examination of the straw before it must be pronounced "rather imperfectly thrashed." If you shake up a quantity of the chaff, the chances are you find grain at the bottom. Is the straw barn empty, it will surely pay to sweep the corn from the floor for the sake of the pigs. And the rank vegetation often seen on the top of manure heaps demonstrates too clearly that we have in the end failed to reap the whole reward of our previous expenditure of time and money. Again, choked hoppers, overloaded fanners, and the barn in confusion, by a complete mixture of chaff and grain, are not such uncommon events, that any farmer would dream of losing his temper, or even of speaking a sharp word. These disagreeables and mischances are coolly set down as belonging to the nature of the machine. And when you hear complaints of the slowness of railway trains, and the stoppages at stations, we may be excused a little grudging and grumbling if, after two days' thrashing, it takes four days, as it usually does, to dress grain fit for market, and to clean up the barn. At this period of our history, and advance in mechanical science, we are surely entitled to look for something more expeditious and perfect.

Throughout the greater part of England matters have proceeded somewhat differently than in Scotland. From a supposed redundancy in the population, aggravated by the poor laws and the law of settlement, it is only within a recent period that thrashing machines have gained a footing there. In Mr. Boy's agricultural survey of Kent, published I believe at the close of last century, that gentleman states that his own thrashing mill was the only one in that flourishing county. He states; "I find there is a saving of nearly one-half of the expense of thrashing, besides the advantage of getting the corn out cleaner from the straw. There is, however, no small inconvenience attending so large a quantity of straw, chaff, &c., being got out at one time, when perhaps it is not wanted; and by that means it is either wasted or spoiled by neglect, before it comes to use." A commentator, in 1801, considered this disadvantage as imaginary, or at least easily obviated, "being convinced from *trial*, that if carefully and closely packed *at the instant*, straw receives no manner of damage from keeping, particularly if not much mangled or broken. But they who apprehend the contrary may secure themselves by cutting it into chaff forthwith, in which state we have Mr Young's authority that it will keep, undergoing a gentle fermentation. This process may be forwarded, by now and then throwing a little water on the heap, which, however, must be laid in a brick or stone building, having proper ventilation in the roof." Whether it was the failure of this plan of keeping the straw, or, as I suspect, the more potent reasons I have already mentioned, there can be no doubt tha until lately thrashing machines never found much favour in the midland or Southern districts of England. In my first journey to the south I was astonished to find that the whole of the grain was thrashed by flails, on several large and otherwise well managed farms. I remember even in 1851, of a gentleman who farmed part of his own estate in Essex, showing me a small thrashing machine driven by a man, and which he looked upon as a very great improvement. A Scotchman has difficulty in comprehending this state of matters. However, the machines in use in England have risen from a broader origin, and exhibit much more diversity in their structure than the Scotch ones. It would be needless to go over all the improvements real or supposed that have from time to time been patented and brought before the public. I may mention shortly, that Mr. H. P. Lee, of Maidenhead Thicket, first introduced the principle of feeding without rollers, and his machine is supposed to contain the germ of the best English thrashing machines of the present day. The peg drum machine was invented by Mr. Aitkinson, of Masham in Yorkshire; it likewise has a high speed drum, but it has not obtained the success at first anticipated from it. Rubbing, bolting, or high speed drums have always in England been more in favour than those on the beater principle. For long the thrashing mills in general use there, have been carried about from one farm to another, and let out for a time to those who required them; they used to be only made for thrashing, and had seldom either circular rake or fanner attached, the want of which enabled them more easily to obtain the requisite speed for these drums. A few years ago they were all propelled by horses; but now steam, with improved machinery, which not only thrashes, but dresses, sacks, and weighs the corn ready for the market all at one operation, has completely banished these horse machines. Of course, men who make a livelihood by going about with thrashing machines are in a very different position from Scotch farmers, who consider it absolutely necessary to have a fixed machine on every farm. When the latter erect a mill, they expect it will rerve their sons after them, and that it should thrash tolerably clean is all that has hitherto been expected from it. But a machine that is made to be let out goes at once to the wall, if another appears in the district with a single point of superiority. The introduction of portable steam engines gave the means of working a higher class of machinery, and the possessor of one improved machine compelled the purchase of many, which must have created a large demand, and accounts at once for the spring that has been lately made by the English makers, and the perfection to which their machines have so suddenly and recently attained. It was only in 1842 that the first portable thrashing machine on wheels driven by steam was made by Messrs Tuxford of Boston. The first combined thrashing machine was also brought out by them in 1844 for Mr. George Holland of Carrington; the combination consisting in this case of only one part besides the thrashing drum. They were speedily followed and improved on by other firms and makers; and doubtless Messrs. Tuxford's machines are now something very different, and their originals will long ago have been thrown aside as useless lumber. In 1854, Messrs. Clayton & Shuttleworth of Lincoln constructed portable machines, which dressed the corn twice at one operation, which was considered a great stretch, until in 1855 the machine was made to dress and finish it for market. In describing these improvements, I have no intention of singling out particular firms as being superior to others; in fact, I know too little of the construction that distinguishes the machines of many eminent makers, to be able to draw comparisons. But having been for a long time much dissatisfied with my thrashing machine, and thinking of having a new one, I paid some attention to the portable machines at the Royal English Agricultural Society's Show at Carlisle, and was much struck with their performances. Several of Clayton and Co's machines having been put up in Scotland, I took an early opportunity of inspecting the one obtained by my friend, Mr. Gulland, at Monktonhall. I was so pleased with it that I was resolved to have one of the same construction. Accordingly, Messrs Clayton, Shuttleworth & Co. fixed one for me last summer. It is driven by a six-horse engine, erected by Mr. Sked, in 1836. I have got a new boiler 18 feet long, and 3½ feet diameter; the old one, being barely 12 feet, was considered too small. I find I have abundance of power, and now consume considerably less coal than formerly. This machine gives me entire satisfaction. I have now thrashed nearly a whole year's crop with it, and we have never had any breakage or the slightest trouble with it, and it continues to go as smoothly and efficiently as the day it was started. It thrashes and dresses white corn equal to the average samples in Haddington market; beans come from it rough, but it thrashes them well, only requiring the concave below the drum to be thrown well back. I generally put the grain through the hand fanners previous to measuring it up, as this equalises the sample; and though previously well cleaned, every practical man knows that grain is well dressed indeed, if you cannot blow or riddle something out of it. I will now attempt to give you a short description of this machine. There are no feeding rollers, but the opening to the drum is rather below the centre of it, and the straw or grain is put in crossways, for it does not signify whether the heads come first or not, and they pass below the drum, in place of above it, as in the Scotch drum. This drum is styled Goucher's patent, with Clayton's improvements. Both it and the concave below it, through which a great part of the grain passes at once, are made of wrought iron. The drum is 4 ft. 6 in length, and 1 ft. 10 in diameter. It presents a rounded surface to the corn, grooved in an oblique direction; one arm is grooved obliquely from right to left, the next from left to right. The drum makes 1000 revolutions in a minute. The straw is thrown by its rapid motion at once on the shaker, which is termed Goods' Patent Shaker. It is divided into five boxes, three of which are on rocking arms at the receiving end, and two at the delivery end, which causes three at the delivery end to receive a jerking action, and two at the receiving end the same; the cranks being placed in the centre, cause an equal upright jerking movement throughout. As the one set of boxes ascends the other set descends, by which means the straw receives a succession of sharp blows, which effectually shakes out all loose grain. This succession of blows also carries forward the straw from the drum, and makes room for the succeeding portion. Except this shaker, which has boxes below it requiring to be filled with grease once a day, all the other bearings or parts requiring to be oiled are outside the machine. A great part of the corn falls at once through the concave on to a plain board, which extends also below the shakers. This board has a reciprocating action on an inclination, which carries the corn, chaff, and cavings or short straw to the first riddle, which separates the corn and chaff from the cavings, and delivers the latter outside the machine; the chaff and corn fall on another inclined board, which carries them to the second riddle, and subjects them to the first blast, which takes out the greater part of the chaff. A second inclined board takes the grain to a third riddle, to take off anything larger than corn. The corn passes from the third riddle over an inclined screen (which takes out small seeds) on its way to an elevator. This elevator takes it up to the barley hummeller, where a spout admits of the grain being put into sacks, or passing on through the hummeller, which, by having the slides open, acts as a carrier; it may again be delivered into a sack, or it passes down, and the operations it received on the second and third riddles and blast are repeated, constituting the second blast, and fourth and fifth riddles. On leaving the fifth riddle, it reaches the second elevator, and is carried up and subjected to the third blast, where it can also be taken out as it passes on to the rotary screen, with Palmer's separator blades, which sizes the grain and finishes the operation. I may sum up, I am afraid, this rather vague description with repeating that the grain is five times riddled, thrice blasted, once screened, and once sized. As there are no toothed wheels in the machine, the whole being driven with belts and pulleys, it is not liable to breakage, and the chief noise is the loud hum of the drum, which sounds at a distance like a huge French top. It is extraordinary the quantity of work it will do, the difficulty being to get people to carry off the straw fast enough. It thrashes clean, and shakes the straw admirably; however, with very thick feeding, a small quantity of grain may be found under the straw-heck. Of course it requires some knowledge to set the concave properly in relation to the drum, to thrash clean, and at the same time not to injure the grain; with a little experience this is soon obtained by a workman of ordinary intelligence. The chaff is deposited at one end of the machine, and the straw at the other. This latter comes out so unbroken that it might almost be again tied up into sheaves. I think this a matter of some importance, even for littering cattle; it remains longer dry than broken straw, and it is incomparably superior for thatch. Before last harvest I was thrashing some wheat stacks at Fenton farm with an excellent Scotch mill put up 12 years ago, and I wished to make the straw into thatch; but it came out so broken as to be quite unfit for that purpose. I therefore drove the unthrashed grain to Fenton Barns, put it through the English mill, and sent the straw back tied up into excellent thatch. I had the Scotch mill completely overhauled at the same time last summer that the English mill was fixed, and having used both regularly since then, I thought it would be well to test the one against the other. The first trial was with wheat. Two carts were placed beside the stack, and sheaf about was regularly given to each; then other two carts were loaded in the same way, thus giving two loads to each machine. The carts having been previously weighed, were again weighed when loaded. The weight of the grain and straw sent to the English machine was found to be 30 cwt. 1 qr. 8 lb., and to the Scotch mill 29 cwt. 3 qr. 14 lb., making a difference of 44 lb. of additional grain and straw sent to the English mill. This latter produced of wheat, including best and light, 12 cwt. 14 lb. The Scotch mill gave only 11 cwt. 2 qr. 1 lb., being 69 lb. less. If 17 lb. are deducted for the extra weight of grain and straw in carts sent to the English mill, it will leave 52 lb. as the net gain on 1289 lb., or rather over 4 per cent. in its favour. The time taken to thrash these quantities was, by the English mill, 25 minutes, and by the Scotch mill 40 minutes. The straw that had been thrashed by the English mill was then put through the Scotch machine, and 10 lb. of wheat were obtained; and the straw from the Scotch machine, on going through the English one, produced 14 lb. The wheat was excellent quality, had been secured before the rain, and having been cut by a reaping-machine, there were few or no heads at the bottom of the sheaves, so that the circumstances were highly favourable for the Scotch machine. The next trial was with oats. When weighed, the oats from the English mill were found to be 43 lb. per bushel, while from the Scotch mill they were only 42½ lb.; but there was an extraordinary discrepancy in the quantity in favour of the Scotch mill, which made me doubtful of its accuracy. At least it did not appear the grain was left in the straw, for on putting what came from the English mill through the Scotch one, literally nothing was got; while, when the straw from the Scotch mill was put through the English one, 12 lb. of oats were obtained. This experiment not having been conducted altogether under my own immediate superintendence, and the person who weighed the grain admitting it was probable he might have been mistaken with regard to the weights, I resolved to make another trial with oats. On this occasion the weight of the grain and straw thrashed by the English mill was 25 cwt. 18 lb., and by the Scotch 25 cwt. 84 lb., thus giving the latter 66 lb. of additional grain and straw, though I saw sheaf about given to each cart, which shows the necessity of weighing if perfect accuracy is required. The English mill produced 997 lb. of best oats, weighing 43¾ lb. per bushel, 81 lb. of grey, and 7 lb. of thirds. The Scotch mill produced 932¼ lb. of best oats, weighing 42½ lb. per bushel, 95 lb. of grey, and 22 lb. of thirds—making altogether 1049¼ lb. Thus the English mill produced 35¾ lb. more corn, or 3⅓ per cent., and that without any allowance for the larger weight of straw and grain sent to the Scotch mill, or for what forms a most striking feature in the experiment, the greater value of the oats, from their being 1¼ lb. per bushel heavier, from having passed through the open hummeller in the English machine. The time taken by the English mill was 26 minutes, and by the Scotch one 47 minutes. The oats were the Sandy variety; they had been cut by the scythe, and though particularly tall and rank, they had been well handled, and no rakings were given to either machine, though to the English one it does not signify whether heads or tails go first. I attribute the great additional time taken by the Scotch mill to the extreme length of the straw. As every part of this experiment was done under my own eyes, I feel perfectly certain of its entire correctness. I have no hesitation in saying that before I made these experiments I preferred the working of these high speed drums when propelled by steam. It was evident they did the work much quicker, and I felt sure it was also better done, which these trials have confirmed, and again, the straw being unbroken, was more useful for many purposes.

The people employed at the steam-engine and this thrashing mill are usually three men and nine women and boys. Two horses are also required for driving the grain from the stack to the barn.

	s.	d.
The men's wages may be reckoned at 2s. 6d. per day, or	7	6
9 women and boys at 1s.	9	0
2 horses	7	6
Coals, oil, &c.	6	0
£1	10	0

Forty quarters of wheat may be counted a fair day's work at eight hours' thrashing; this makes the expense 9d. per qr., but exclusive of the interest of capital invested in buildings and machinery.

Machines are being put up by different English makers in various parts of Scotland, and in many instances the bolting drum is being substituted for the old Scotch beater. In my own neighbourhood this is very much the case; my neighbour, Mr. Bridges, of North Berwick, has already changed a considerable number. He does not consider they require more power, though an enlarged boiler is generally necessary, as they are more dependent for complete success on a high uniform rate of speed. In new machines Mr. Bridges also adopts the horizontal shaker, though, from its lifting only at one end, I should scarcely think it so efficient as that used by Messrs. Clayton, Shuttleworth, and Co. He has, however, ingeniously contrived to put three blasts into his mill fanners, to which the corn is subjected before being lifted by an elevator to the finishing fanners, which have two blasts. Thus, with only one elevator, the grain is exposed to five blasts, besides being put through or over five riddles and a shaking screen. I mention these facts to show what is doing, that Scotch engineers see the necessity of marching with the times, and that they are determined not to yield without a struggle to their southern rivals. But we Scotch farmers, nevertheless, owe a deep debt of gratitude to our English friends for the vast improvements they have already accomplished, and we may trust to be still more benefited by their wholesome influence. Viewing these English machines as portable ones, I consider them very near, if not altogether perfect. While I am more than pleased with my own new one, it would be too much to say that, as a fixture, it is unimprovable. The straw and chaff are deposited at opposite ends, which is better than having them together; but I would prefer a side delivery for the chaff; in fact, I have a strong leaning to the old Scotch plan of having the whole dressing apparatus set across the barn; it suits our buildings better. This new dressing apparatus does remarkably well, but it always appears to me too confined. You can only see the effect; you cannot see how it is done; and if any part requires attention, it takes some time to discover where the particular point is. I would prefer seeing the grain finished off by our old Scotch fanners, and desposited in them by Archimedian screws, carrying forward and regulating the feed, as Mr. Hislop has done. Again, from the general height of our buildings, it appears to me greater use might be made of the hopper or inclined plane, to run the grain to the blasts, without the intervention of reciprocating or other movements, which require to some extent an increase of power, besides extra attention and greater expense for wear and tear. But whether right or wrong in these remarks, which I offer with great diffidence, I believe you will all agree with me in thinking that the Highland Society has done well in offering an increased premium for thrashing machines to be exhibited at the Aberdeen Show, and I hope a still more handsome one will be allocated next year for the Edinburgh meeting. The rules which should be adopted in testing these machines require some consideration. I consider the first and greatest point to be clean thrashing, or the perfect separation of the grain from the straw. This can best be ascertained by the self-acting test of weighing quantities of similar straw and grain for each machine, and then weighing the produce. The second point I consider to be the state of the grain as it comes from the machine and the number of separations made in it. This test might also be made self-acting by passing each separation through a dressing machine, and ascertaining the proportion of tail corn left amongst the good, and also the good amongst the tail. The third point might be the unbroken state of the straw. The fourth, the simplicity of construction, strength, finish, and non-liability of the machine to get out of repair. Fifth, time required for the work in proportion to the power employed. Sixth, perceptible injury to the grain, or throwing it over amongst the straw, to be held as disqualifying points. If this meeting was to pronounce an opinion on these matters, it would confer a practical benefit on the Society, and also intending exhibitors, by allowing the former to have proper data to supply to the judges for their guidance, and the latter to know exactly what was wanted and expected from them.

We labour our land, we enrich it with manure often brought from the distant Pacific, we sow our seed, we reap and harvest our grain, and then too frequently throw a large percentage of it away. I trust the time is not far distant when improved thrashing machinery will be so common, as that every farmer in the land will have the satisfaction of knowing that no portion is lost of what costs so much.

The CHAIRMAN asked if any gentleman was prepared to offer any remarks on the paper that had been read.

Mr. SCOTT, Craiglockhart, stated, that having long ago been satisfied with the imperfections of the old Scoth thrashing machine, so ably described by Mr. Hope, he watched with interest the introduction of the English machines, and after careful inspection of the work performed at the English Society's Show at Carlisle, at our own Show at Glasgow, and of a machine he saw at the home-farm at Windsor, and having had a day's trial on his own farm of one of Clayton and Shuttleworth's machines, he formed the opinion that whilst the high speed open drum and horizontal shakers were greatly superior to the Scotch drum and revolving shakers, that the Scotch dressing apparatus was fully as efficient as the English ones, while at the same time it was less complicated, and the working of the different parts more easily seen, and when anything might happen to go wrong, much more easily put to rights; and having a tolerably good machine with three sets of fanners, hummeller, and elevators, he resolved to endeavour to combine these with the English drum and shaker, for which purpose he applied to Messrs. Mollison and M'Vitie, of Earlston, to make the necessary alterations, which they have done by removing the old drum and shakers, and replacing them by a high-speed open drum with patent beaters, and Clayton and Shuttleworth's patent horizontal shakers. The result has been most satisfactory, and from the trials he has made with the different kinds of grain, he can with confidence recommend any person who is not inclined to put up a new machine to make a similar alteration. However, he thought it required more power to drive his thrashing machine than it did formerly, and he had observed that unless the drum be kept up to its proper speed, about 1,100 revolutions per minute, it did not thrash clean.

Sir J. M'Neill: I think it would be satisfactory if Mr. Hope or Mr. Scott could state whether the machine will do its work with horses. This is a matter of some moment in the more remote parts of the country. Does Mr. Scott think that the horse-power machines could be connected in the manner suggested by him?

Mr. Scott stated that he did not think it would be advisable to attempt to work those high-speed drums by horse-power, but thought either water or steam was more suitable as the motive power.

Mr. Finnie, Swanston, said that a farmer in his neighbourhood had twice an English machine, and from what he had heard, the machine did not answer.

Mr. Hope said he had received a letter from Sir John S. Forbes, calling attention to a machine patented by Mr. Isaac Harkless, suitable for a small farmer, whereby one horse could do the work.

Mr. Hall Maxwell: There is one point of great importance to which I may refer. It would be of great moment if any gentleman in the meeting could throw out suggestions in reference to the conditions that should attach to the trial of the machines in the show-yard at Aberdeen, such as were intimated by Mr. Hope. If such suggestions could be made, they might prove useful for the guidance of the gentlemen whose duties it will be to try the machines. I see Mr. Waller, machine maker, present—perhaps he could give his opinion.

Mr. Waller said the points that Mr. Hope alluded to in his paper had been freely canvassed in connection with the English Agricultural Society, and some difficulty had been felt there. The conditions had been left very much to the judges. He thought it very unfair to the maker that his machine should be subjected to a trial even by the most honourable men living, for this reason, that suppose two pieces of the very same quality of paper were taken—one blue and the other white—probably no two people would agree as to their respective value. It was merely a question of opinion, and it was much the same with agricultural machines. Again, in some cases the judges were all agriculturists, while makers were excluded. Now, the agriculturist told the maker what he required, and they tried to succeed to the best of their ability. In some recent cases they had certainly failed, and perhaps had done so with thrashing machines. Clean thrashing depended, he believed, more on the feeder than on the maker of the machine, and he thought that with a plain beater they could thrash as clean as with one of the improved beaters now in use, provided the drum were made suitable, and the beater in a proper state. The drum, as at present in use, was neither more nor less than the Scoth drum invented a hundred years ago, running at double the speed. The new power, instead of applying the old-fashioned drum, substituted an instrument specially adapted to man. Every animal had its greatest power in the direction of the spine, and the flail therefore was best suited to man. The horse worked, as it pulled, in the direction of its spine. The spine of the machine was rotary, and had a revolving power, and therefore the Scotch machine had a revolving drum and a revolving shaker. In the English machines they had gone back again to the horizontal movement with crank shakers. Now, with these shakers, there was a great waste of power, and of course an increased expense. He believed that a shaker crank, with ordinary work, could not work sixty days without repair. If the Scotch machines were put in competition with the English make, he did not think that the English would have a good chance, and the arrangements with regard to the awarding of the prizes would therefore require to be very seriously considered. He thought it would be better if the judges were not all agriculturists. In the English Society the judges were both machine makers and agriculturists.

Mr. Maxwell said that the same thing was done by the Highland Society.

Mr. Waller remarked that, in his opinion, it would also be necessary to come to some agreement as to the number of separations of the corn in the machine. He thought there ought to be four. This would require more power and more expense, but four separations of the grain could be effected as quickly as a fewer number. It was all one operation. It would be fair to the competitors to have everything stated.

Mr. Maxwell hoped that Mr. Waller would send his views in writing to the committee, who would consider the subject.

Mr. Maclagan expressed the pleasure he felt in listening to the interesting history of the thrashing machine given by Mr. Hope, his graphic description of the machine itself, and his statement of the inconvenience, annoyance, and loss to which farmers are subjected from ill-constructed machines. Having seen an admirably working machine erected in his neighbourhood by Clayton and Shuttleworth, and also the results of an experiment made between it and an ordinary Scotch one, he determined to test the efficiency of his own mill by comparing it also with an English one. He, therefore, engaged the machine made by Hornsby and Son, which gained this Society's premium in Glasgow. The experiment was made last autumn with a stack of wheat, of crop 1856. Two carts were placed at the stack, and sheaf about was forked from it to the carts, which were driven and unloaded at the English and Scotch machines. The former thrashed at the rate of 5 qrs. per hour, including stoppages; and sometimes it was found to be thrashing at the rate of 7 qrs. per hour, when it was fed fast and equally. The Scotch machine had not all the modern improvements attached to it—the grain having to be put through the hand fanners once or twice after it had passed through the machine—which thrashed at the rate of 2½ qrs. per hour. The wheat experimented on yielded at the rate of 36 bushels per imperial acre. The results of this experiment have already been published; but as there are probably some present who have not seen it, and as it agrees so nearly with the results of Mr. Hope's experiments, with the permission of the meeting, I will give the details:

	Good Grain.			Weight per bushel.	Gross Weight of Good.		Light Grain.		Weight of good and light.	
	qr.	st.	lb	lb.	st.	lb	st.	lb.	st.	lb.
English machine	28	3	9	62½	128	9	4	10	183	5
Scotch machine	28	2	1	60¾	123	8	5	4	128	12

It is to be observed that the English machine gave both more good grain, and a greater weight per bushel, namely, 1¾ lb., and the sample was decidedly superior, both in appearance and in handling, and contained no broken grain. The results correspond very nearly with those obtained by Mr. Hope, being about 3½ per cent. in favour of the English machine. The good grain from both machines was sent to market, and sold by an agent on the same day; that from the English machine brought 5s. per qr. more than the grain from the Scotch. Wishing to know what became of the wheat that passed through the Scotch machine, he caused some of the straw from it to be put through the English machine, and after a quarter of an hour's working, he obtained 52 lb. of wheat. He also put some of the straw from the English machine through the Scotch one, and after five minutes work, obtained 1¾ lb. of wheat—that is, at the rate of 5¼ lb. in a quarter of an hour. Allusion has been made to the proper feeding of the mill. This is a most essential point; the feeder should have a good ear, he should know when he is feeding properly by the sound of the mill, and the master, though at a considerable distance from the offices, if he has a good ear will be able to tell if the mill is properly fed, simply by the sound which will be carried to him by the wind. A machine is often blamed for bad thrashing when the fault is altogether the feeder's. He was glad to hear Mr. Hope throw out some suggestions as to the elements of judgment to be taken into account in awarding the prize. This is most important; and there is one point in particular to which he would direct attention, namely, a fair and full trial of the machines entered for competition. Farmers will not be satisfied with the short trials in the show-yard, which may be kept up to amuse mere sight-seers, and thus help to swell the receipts at the gates. To show the importance of this subject he supposed that the whole of the wheat crop of 1856, in Scotland, had been thrashed by Scotch machines of equal efficiency to those used by Mr. Hope and him. By the agricultural statistics, 7,270,952 bushels of wheat were produced in 1856, which is equal to 908,869 qrs., and as 5s. per qr. more was obtained for the English thrashed than for the Scotch thrashed, there was a loss of £227,217 to the farmers of Scotland, from crop 1856, from using the latter instead of the former. It will be said that it was not all loss, as the pigs would get some of it; true, but there is no profit in giving to pigs, at present, food that is good for man; and slovenliness in one operation on the farm is sure to lead to slovenliness in others. This is no small sum, and it is no small matter for the Society to deal with. It has shown its anxiety in the subject by proposing this subject for discussion, and by offering a pretty large sum for the best thrashing machine, to be competed for in 1859; but whatever the expense, it must see that there be a fair and full trial of the machines when brought forward. It is rich, and is yearly laying past money; it has now a large sinking fund, and it can therefore well afford a good sum for carrying out an improvement so much desired as that of the thrashing machine. We must bear in mind that the usefulness and wealth of a Society such as this, is not shown by its always adding to its sinking fund, and by the amount of capital it has in the bank. Its usefulness and capital are rather shown in the zeal which it excites in its members, and in the improvements which are originated and carried out by its aid; and the interest of that capital is something far better and more lasting than mere money interest; it is the results of these improvements contributing to the prosperity of its members, the comfort of the community at large, and the permanent wealth of the country.

Sir JOHN M'NEILL: Was the grain you sold at market, sold to the same person, or to different parties?

Mr. MACLAGAN: The grain was sold in the same market, but I cannot say whether it was sold to the same person.

Mr. MAXWELL said there was every desire on the part of the directors to secure as fair a trial as possible, and they would neither spare time, trouble, nor money in endeavouring to obtain it. At the same time, he might allude to this little difficulty. The English makers, if they had their own way, would have no trial whatever. They said, "We don't want you to judge of the respective merits of our machines;" but the directors thought they were bound to take the best means of telling the people who came to the show, what in their opinion was the best machine. The directors had a duty to perform to the machine makers on the one hand, and to the public on the other; and they would take care that the trial should be the best that could be procured.

Sir JOHN M'NEILL hoped that the Scotch machine makers would not allow their English rivals to go a-head of them.

In answer to Mr. WALLER,

Mr. MACLAGAN said, he thought the drum of the machine used by him was what was called a peg drum.

Mr. SUTTIE thought the machines should be tried with different kinds of grain. A great deal, in his opinion, depended on the style of feeding, and he hoped the judges would be very particular in selecting the feeder. If possible, they should have the same feeder for the whole of the mills. (Expressions of dissent.) Mr. Suttie went on to say that the English machines broke the straw, and that he had found a Scotch machine with peg drum thrash oats much cleaner than with the English machine.

A member wished to know if the peg drum would answer as well with steam as with horse power?

Mr. HOPE said, the right of patent was sold to various parties, and machines had been put up, but they were all taken down again in a few months. They did not answer when driven by steam. He did not know what was wrong.

Mr. WALLER said the peg drum was an American invention, and from the nature of its construction it must break the straw.

Mr. MACLAGAN: In the drum of the machine which I used the thrashing was performed by means of rubbing, and not by beating. There are rows of buttons on the drum, and also on the concave, which buttons rub against one another on the grain, exactly as if the grain was held in the hands and rubbed. The straw came out beautifully unbroken. It was so good that I thatched my stacks with it; after that I used it for thatching my turnip pits, besides using it for some other purposes.

No other member offering further observations,

Sir JOHN M'NEILL brought the discussion to a close by saying, that it was impossible for any one, whether connected with agriculture or not, to doubt of the importance of the subject to the welfare of the community, or to doubt of the excellent mode in which it had been brought before the Society by Mr. Hope.

A vote of thanks to Sir John terminated the proceedings.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held on Wednesday, the 7th of April: present—Colonel Challoner, Trustee, in the Chair; Lord Walsingham, Lord Feversham, Hon. W. G. Cavendish, M.P., Sir Watkin W. Wynn, Bt., M.P., Sir Charles Gould Morgan, Bt., Sir John V. B. Johnstone, Bt., M.P., Sir Archibald Macdonald, Bt., Mr. Raymond Barker, Mr. Bramston, M.P., Mr. Brandreth, Mr. Caldwell, Mr. Druce, Mr. Brandreth Gibbs, Mr. Hamond, Mr. Fisher Hobbs, Mr. James Howard, Mr. Humberston (Mayor of Chester), Mr. Jonas, Mr. Lawrence, Mr. Milward, Mr. Paget, M.P., Mr. Pain, Colonel Towneley, Mr. Turner (Barton), Professor Voelcker, Mr. Vyner, and Mr. Jonas Webb.

The following new members were elected:—

Barra, Thomas, Brompton Hall, Churchstoke, Salop.
Benington, Thomas, Wallingfen House, Brough, Yorkshire.
Case, Thomas, Testerton Hall, Fakenham, Norfolk.
Claridge, William, Pitchford Park, Salop.
Collings, Rev. William, Sark, Channel Islands.
Davies, Richard, Aylstone Hill, Hereford.
Ellison, Henry, Stone, Tickhill, Rotherham.
Evans, Edward, Boveney Court, Windsor.
Finch, Jacob, 1, Adelaide Place, London Bridge.
Gardner, Francis, Ryburgh, Fakenham, Norfolk.
Garsed, John, The Moorlands, Lantwit-Major, Cowbridge, Glamorganshire.
Grundy, Edward S., Reddish Hall, Lymm, Warrington.
Henry, Frederick, Lodge Park, Streffan, Scotland.
Horner, James, Lincoln.
Houblon, John Archer, Hallingbury Place, Bishops-Stortford.
Jackson, Robert, Corporation Road, Carlisle.
Johnson, J., Gunnersbury Park Farm, Ealing, Middlesex.
Johnson, J., junr., Hanger Hill Farm, Ealing.
Kettle, George Mackenzie, Dallicot House, Bridgenorth.
Lockhart, William, Hall Wood, Sutton, Chester.
Mead, James, Penryn, Cornwall.
Menson, James, Brinsworthy, Northmolton, Devonshire.
Naylor, Richard Christopher, Hooton Hall, Chester.
Osbiston, Samuel, junr., Ryburgh, Fakenham, Norfolk.
Price, Joshua, Featherstone, Wolverhampton.
Richards, John, Mathgrafel, Meifod, Montgomeryshire.
Rigg, Rev. Arthur, The College, Chester.
Roscoe, Edward Henry, Newton House, Chester.
Sill, Rev. John Parkinson, Witheringsett Rectory, Stonham, Suffolk.
Stark, Michael John, Duke's Palace Bridge, Norwich.
Stobart, John Henry, Witton-le-Wear, Darlington.
Strode, George Sidney, Newnham Park, Plympton, Devon.
Trench, William Stuart, Essex Castle, Carrickmacross, Ireland.
Tuley, Joseph, Truewell Hall, Keighley, Yorkshire.
Walker, Rev. T., Clipston Rectory, Northampton.
Walker, John, Newton Bank, Chester.
Weeding, Mrs., 47, Mecklenburgh Square, London.
Welsh, John, Kirkton, Hawick, Scotland.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the monthly report on the accounts of the Society, from which it appeared that the current cash-balance in the hands of the bankers was £868.

HORSE-SHOEING.—Mr. Thompson, Chairman of the Journal Committee, reported the completion of a cheap reprint of the article in the last Journal on Horse-shoeing, by Mr. Miles, of Dixfield, near Exeter, of which members had the privilege of purchasing copies (at the office of the Society, 12, Hanover-square), at the rate of half-a-crown per dozen.

EDITORSHIP OF JOURNAL.—Mr. Jonas had leave to postpone his motion, "on the best course to pursue for the future editorship of the Journal," till the next Monthly Council.

LECTURES.—Colonel Challoner, at the previous Monthly Council, having called the attention of the meeting to the desirableness of having a lecture delivered before the members once in each month during the season, Mr. Fisher Hobbs moved, and Mr. Raymond Barker seconded, the following resolutions, which were carried unanimously:

1. That there shall be not less than four lectures during the season.
2. That Professor Voelcker, the Consulting-Chemist of the Society, be requested to deliver a lecture before the members in the Council-room of the Society, on Wednesday, April 28th, at half-past 12 o'clock, on "Agricultural Chemistry in its Relation to the Cultivation of Root Crops."
3. That the Journal Committee be requested to make ar-

rangements with the professors of the Society, for the ensuing lectures of the session; and to report the same to the Council at its next monthly meeting.

4. That each lecturer be required to furnish the Secretary, within one month from the date of delivery, with a copy of his lecture prepared for publication.
5. That a short-hand writer be engaged by the Society for the use of the lecturer, if required by him.

Prof. Voelcker, who was present, cheerfully acceded to the wishes of the Council, and engaged that the corrected copy of his lecture should be placed in the hands of the Secretary on the day after its delivery, ready for immediate publication. He considered that leading expositions of the agricultural questions of the day were best adapted for the purpose of lectures intended to be of a popular character; while the more matured discussion of results obtained in the laboratory, and their bearing on the principles and practice of agriculture, should be reserved for papers in the *Journal*, for which it was his intention that one at least should constantly be prepared and laid before the Journal Committee for publication in each successive number of the *Journal*.

THRASHING-MACHINES.—Colonel Challoner, as Chairman of the Implement Committee, reported that Messrs. Garrett and Sons, of Saxmundham, having inquired "for what machines prizes Nos. 6 and 7 (in the Society's Implement-sheet for the Chester Meeting) are offered, whether they are to be *simple* thrashing-machines, or *combined* machines having a straw-shaker, screen, or winnowing-apparatus attached, or one or more of these additions?" the Implement Committee had agreed to the following resolution, namely, "That the prize No. 6, for the best portable thrashing-machine for 6-horse power, is restricted to a simple thrashing-machine, having a straw-shaker; and that the instructions to the Judges would be in accordance with such resolution: That the machine for prize No. 7 would have a similar restriction, only would be worked by steam."

CHESTER MEETING.—The Hon. W. G. Cavendish, M.P., Vice-Chairman of the General Chester Committee, reported the favourable progress of the arrangements for the ensuing Chester Meeting in July. He made special reference to the plans under consideration for the best mode of exhibiting the very large amount of cheeses expected to compete for the local prizes in that department.

STEWARD-ELECT OF IMPLEMENTS.—On the motion of Sir Archibald Macdonald, Bart., seconded by the Hon. W. G. Cavendish, M.P., Mr. Cardwell, of Hilborowe Hall, was unanimously appointed steward-elect of implements at the Chester Meeting.

COUNTRY MEETING OF 1859.—Memorials and other documents received from cities and towns within the district of the country meeting for next year (comprised of the counties of Berks, Northampton, Oxford, and Warwick), were referred to an Inspection Committee, consisting of the Hon. W. G. Cavendish, M.P., Mr. Raymond Barker, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, and Mr. Milward, with a request that they would visit the several localities to which the society had thus been invited, and report the result of their personal inspection to the Council at its next monthly meeting in May.

MEMBER OF COUNCIL.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Milward, Mr. Huskinson, of Epperstone, Nottinghamshire, was unanimously elected a general member of Council, to supply the vacancy occasioned by the transfer of Mr. Thompson to the class of Trustees.

LABOURERS' COTTAGES.—Sir John William Lubbock, Bart., favoured the Council with the details of expenses incurred by him in the construction of a labourer's cottage in accordance with the plans of Mr. Isaac, of Bath, published in the Journal of the Society. This communication was referred to the Journal Committee, with a request for a special report.

Adjourned to April 14.

A WEEKLY COUNCIL was held on the 14th of April: present—Lord Berners, President, in the chair, Mr. Alcock, M.P., Mr. Raymond Barker, Mr. Foley, M.P., Mr. Fisher Hobbs, Rev. L. V. Harcourt, Mr. Thomas Scott, Mr. Vyner, and Mr. Burch Western.

M. C. B. von Neergaard addressed a letter from Denmark, announcing his invention of a drill-plough, which he desired to have exhibited, and if possible tried, at the Chester Meeting. Mr. Freer, of Rothley, applied for a further trial of his grain and seed-planting machine, exhibited at the Salisbury Meeting.

The Highland and Agricultural Society of Scotland presented copies of their premium-list of essays and reports for 1858 and 1859, and of stock, implements, &c., for their general show at Aberdeen at the end of August, 1858, and at Edinburgh in 1859. The Essex Agricultural Association transmitted the rules and schedule of prizes for their exhibition at Chelmsford, on the 15th of June next. Mr. Tanner presented a copy of his Prize Essay on the Cultivation of Dartmoor; the editor of the *Dublin Agricultural Review*, the first number of that new periodical; the Californian Agricultural Society, the Official Report of their fourth annual fair held at Stockton in the autumn of last year; the Normandy Association a copy of their *Annuaire;* the Algiers Society the 4th No. of their proceedings; the editors of the *Archives de l'Agriculture* of Lille and the *Revue Agricole* of Valenciennes, copies of their respective journals; M. de Gingins d'Eclepens (foreign juror from the Swiss Government at the Chelmsford Meeting), a copy of his Report addressed to the Swiss Federal Council, on the Chelmsford Show, and on English Agriculture; the Count de Gourcy, a copy of his agricultural *Pérégrinations;* and M. Rohart, a copy of his elaborate work on the Economical Manufacture of Manures.

The Council, having ordered their acknowledgments for the favour of these presents, decided, at the suggestion of the President, to recommend to the Monthly Council that the attention of the Journal Committee should be called to the foreign works recently presented to the Society, with the view of having such portions of them translated and published in the Journal as might be considered likely to afford practical information to the English farmer.

Adjourned to April 21.

A **Weekly Council** was held April 21. Mr. Raymond Barker, V.P., in the chair; the Baron de Fircks, Mr. Caird, M.P., Mr. Druce, Mr. Foley, M.P., Mr. Fisher Hobbs, Mr. Majendie, Mr. Thomas Scott, and Mr. Burch Western.

Nitrate of Soda.—Mr. Caird, M.P., laid before the Council the following correspondence between himself and the Foreign Office on the occurrence of Nitrate of Soda in South America:—

"Foreign Office, March, 27, 1858.

"Sir,—With reference to Mr. Hammond's letter to you of the 6th of January last, I am directed by the Earl of Malmesbury to transmit to you herewith a copy of a despatch from Mr. Morgan, her Majesty's Consul at Bahia, respecting the discovery of deposits of nitrate of soda.

"I am, sir, your most obedient humble servant,
"Wm. Seymour Fitzgerald."

"J. Caird, Esq, M.P."

(Copy.) "Bahia, February 18, 1858.

"My Lord,—I have the honour to acknowledge the receipt of your Lordship's despatch No. 1 of January 7 last, instructing me to report, after a careful inquiry, on the localities in which nitrate of soda has been found in this province, its state of purity, the cost of extracting and refining it, and the expense of transport to a shipping port. In reply, I beg to state that ever since the mention made in my commercial report for the year 1856 of the discovery of this important manure in this province, I have received undoubted information of its existence in several other localities, and in consequence lost no time in renewing my exertions, with the assistance of a few friends having connections in the interior, to obtain every information possible thereon. The information received from several districts is such as to satisfy my most sanguine expectations, especially in the north-east of this province, in the neighbourhood of the river San Francisco, at a place called 'Salitre'—saltpetre (the generic name given to nitrate of soda, the use of which is unknown here). In the words of a most distinguished and talented native of the town of Joasciro, on the St. Francisco, now one of the deputies of this province to the General Assembly of the Empire, the district of 'Salitre' is only seven leagues distant from the town of Joazeiro, and through a valley of sixteen to twenty leagues long, one mass of nitrate of soda is found; in some places on the surface, at others a few feet under; and contains sufficient manure for exportation for years to come. On the opposite side of the above-named river, near the town of 'Pilao-Arcado,' other deposits exist in equal quantities. Now the projected Bahia railroad to the town of Joazeiro must pass through the first-named district; but those magnificent deposits will only become available when that railroad reaches the St. Francisco. In the interest of the company and of commerce, it is ardently to be desired that its works should be commenced and prosecuted with vigour, as the distance is only 240 miles from this city. When I shall have received the replies to the queries I have forwarded to the several localities, I shall make up a report thereon for your lordship, and transmit at the same time the samples of nitrate I am equally promised. I have, &c. (Signed) "J. Morgan."

On the motion of Mr. Fisher Hobbs, the thanks of the Council were addressed to Mr. Caird for the favour of this communication.

The following communications were also received:—1. From the Society of Arts, requesting co-operation in obtaining detailed information respecting the supply of Gutta Percha, and its employment in the manufacture of tubing for agricultural purposes. 2. From the Treasurer of the Massachusetts Agricultural Society, requesting information on the purchase of Ayrshire cattle. 3. A verbal statement by Baron de Fircks on manuring the black soil of the German provinces of Poland by burning the straw of the flax grown upon it, after the removal of the seeds. 4. From Mr. Wright, of Sigglesthorne Hall, a paper on the management of a herd of breeding cattle, with especial reference to the kind of diet, the treatment and condition best calculated to ensure regular fecundity and successful gestation, and on the causes which operate adversely in particular seasons. 5. From the Port Philip Farming Society in Australia, copies of their Transactions and Prize Sheets. These communications were referred to the Monthly Council and the Journal Committee.

Mr. Foley, M.P., laid on the table a statement of the great public inconvenience arising from different standards being employed in different districts for the purchase and sale of agricultural produce.

Adjourned to the 28th instant; when the Council would meet at 12, and Professor Voelcker deliver a lecture before the Members of the Society at half-past 12, "On Agricultural Chemistry, in relation to the cultivation of Root Crops," open to all Members of the Society.

MANURES, AND THEIR APPLICATION.

A PAPER READ BY MR. MITCHELL, BEFORE THE MEMBERS OF THE PENRITH FARMERS' CLUB.

Dec. 22, 1857.

The subject which I have been kindly requested to bring under your notice to-day, is one certainly not altogether of my own selection. Had it been so, had I been left entirely to my own choice, it is more than probable I should have called yout attention to some topic or other of less importance; less vital in its consequences to our very existence as practical agriculturists; not that I think the subject unsuitable or unfit for discussion, but from the dread lest it should suffer damage in the hands of an unfit expounder.

The subject, as announced, "Manures, their adaptation, or proper and seasonable application to the soil," is one, and perhaps I may be allowed to say, the most important of all the subjects to which our attention as agriculturists can possibly be directed; because, holding as I do, and that most strongly, what from the increased and increasing value or rental of farms, the increased though not increasing rate of labour, and the increased value of artificial manures, that unless proper attention is paid to the prudent and economical application, as well as liberal and generous allowance of manures to our fields and crops, it is in the very nature of things utterly impossible for the agricultural interest to keep (I neither mean nor say) *a-head* but *a-breast*, for that is our proper and natural position, with the commercial and manufacturing interests of this great country. Yes, sir, the time is gone by, when isolation can benefit any class; and certainly if anything were yet needed to dispel remaining class importance and bigoted imaginary independence, it is the sad, I had almost said the unparalleled money crisis, or ordeal through which our own country and other nations of the earth are at this moment passing. Talk, sir, of independence!—what can be the use of such a word, when England, the wealthiest country in the world, reels and staggers the moment brother Jonathan lives beyond his means, and thereby becomes unable to meet his just obligations? And if it be so with nations, so is it with individuals, professions, and classes, and so is it with agriculture. Agriculture can only thrive as such, when our mercantile and manufacturing interests are in a healthy state; in fact, they are mutual handmaids, or helpmeets for each other. And bearing this in view, I proceed, without further preface, to grapple with my allotted subject.

In doing so, I assume our lands are ready for the reception of manures; not ready, like the toil-worn horses, by over-taxation, work, and exhaustion, but ready from being laid dry and clean.

All of you, I presume, are practically, if not literally familiar with the sage saying, "Dry your lands, clean your lands, and feed your lands." By-the-bye, sir, you may remember being present at our last agricultural society's dinner, held in this very town. Our chairman, on that occasion, Mr. Crackanthorpe, claimed the authorship of that sagacious saying on the part of Lord Lonsdale. Had Mr. Crackanthorpe been conversant with the agricultural writers of Rome, he would have known that it was Cato, the famous old Roman, and not my Lord Lonsdale, who uttered those memorable words, so pregnant now with the experience of ages, "Dry your land, clean your land, and feed your land."

Assuming that all whom I now address are disciples of old Cato, and that all your lands are dry and clean, I proceed, not theoretically, but practically, to point to those manures, as also the season, manner, and crops, to which they should be applied, in order to ensure successful results. Of course, most of you are aware of the length of time to which my observations in this district of country extend; and therefore it is, I only expect, and ask you to pay that attention, which the facts to be stated, and the circumstances of the case, may seem to demand at your hands.

To proceed then, and at the very beginning I meet with difficulties, these difficulties arising, in part, if not altogether from the variety and number of manures now palmed upon the agriculturist, each claiming for itself to be the very panacea for all the wants to which our cereal and vegetable crops are subject. And the first of these, and perhaps the one upon which more than upon all the others put together, there is the greatest diversity of opinion as to whether it is a manure or not, is the farmer's time-honoured assistant—lime. Many, and some of them great authorities too, only assign lime a place in the apothecary's or druggist's shop. Now, sir, with all respect to these eminent authorities, I make bold to say, they have maintained, with fully as much dogmatism as practical common sense, that lime is simply a purgative or medicine.

Sir, I know not which may be the general opinion entertained by this Club, touching the ingredients which compose the most useful article in the manure table or shop of the sagacious farmer of olden times, nor am I at all anxious to open up what I fear might only lead to, and end in very unprofitable discussion. But assuming, if there is even one here who holds that lime is simply a purgative, and not a manure, even that one will admit, that waving the discussion (manure or medicine), lime is, at all events, a very large manure-producer. How, the question then is, and in what state should lime be applied? I presume, we are all at one in reference to the necessity of its being burnt, calcined, or in a caustic state. The question is, how long should it lie after removal from the kiln, and before its application to the land? And before we are in a condition satisfactorily to answer this question, we must ascertain what results are expected from its application, and to what it is to be applied. In a general way, we say, if it is to be applied to old grass land, that is, land never intended to be turned by the tearing plough, or at all events very remotely, then to all such, but to such alone, let it be completely fallen, dissolved, cooled: in fact, all but soured, before it is spread over, and in a quantity of not less than ten tons, and up to fourteen per acre. This quantity, the larger especially, is a liberal and generous allowance, in fact almost a complete covering to the land, and tends mightily to eradicate and waste away the old moss, which, whether it be from the extreme humidity of these two counties, Cumberland and Westmoreland, I know not, but certain is the fact, moss is most predominent in all our high pastures. And if this statement is borne out by observation, which I maintain it is, then certainly no small or inconsiderable advantage is gained; as I doubt not, the theoretical, as well as practical grazier, must have noticed the single-pointed grasses that find their way late in spring, through the dense hide or carpet of moss with which all our high, and, even in many cases, our low-lying pastures abound. Such pastures, lying in a state of nature, may be, and generally are stocked or stinted late in spring, or early in summer, with cattle. But what is the consequence? The poor animal is doomed to endless toil. He must rise early, and labour late to keep alive, to keep the skin and bones together, and then, when withdrawn at our ever-memorable Broughhill time, the owner or grazier finds the summer past, and his beast neither bigger nor better, and that although paying a stint price—hardly an acknowledgment for possession—he has actually been paying too dear for his whistle. But, on the other hand, wherever this class of land or pasture has had a liberal allowance of lime, in the manner described, there immediately, without any application of seed, we get a carpet of choice white clover, not only keeping our cattle in good condition, but in many cases otherwise favourable, with shelter, &c., making them fit for the shambles, and besides keeping such extra numbers, the very droppings of which soon manure and quicken the pasture. Having, I hope, satisfactorily disposed of the liming of lands intended for perpetual pasturage, or, at all events, in such a way as to make myself understood, I proceed briefly to call your attention to the liming of lands under or intended for cultivation. To all such I recommend, and recommend strongly, the application of lime in the hottest possible state, and in quantities of from seven to ten tons per imperial acre. If the land has never been broken up, or has lain in green for any length of time, then let the application be made two or more years before breaking up, and considering the somewhat mountainous country where our lot is cast, the rains of winter and tempestuous winds of spring, with which we never fail to be visited, I would recommend the summer season as the best for having lime properly burned and applied. Rest assured there is too little attention paid by all of us in having lime in a proper state. At this season—I mean summer—there is scarcely any risk in having one side of the lime-kiln burnt to a cinder, the other cold and hard as the quarry from which it was excavated. Neither are the horses, carts, and harness, from frequent rains during the transit from the kiln to the field, so liable to be burnt; in short, less wear and tear every way. Of course, some may object to this season as being the very one when pasture may be said to be in the greatest luxuriance; this is not difficult to surmount. Either cut a hay crop and lime immediately afterwards, or if the field be unsuitable for hay, then withdraw all your cattle from your other fields, and eat over as close as possible, and long before the after-math from the hay, or the springing after the eatage is ready, to afford a full bite to the short-horn, the hot lime will have found its way to the roots of the grass, and be out of the way for injury to the tongues and teeth of the animals depasturing thereon. Some may suppose from the drought of the season, generally in summer, that a long time will elapse ere the lime falls or flours. No fears need be entertained on this score; the dews falling at this season are amply sufficient for the purpose: and be it remembered, there is no need for every piece of the lime to be completely fallen; twenty-four hours after spreading finishes the slaking. Lime applied in the extreme hot state, so far as my observation extends, does not kill and destroy old moss or fog, as it is sometimes termed, so quickly nor so effectually as when in a colder and soured state; still it finds its way quicker to the roots of the grass, and there, like an ever active agent, tenders or sears the sward, so that when the day and implement of destruction (the plough) arrives, the field lifts more like any tender new lea break, than the tough stubborn unmanageable soil we are accustomed to see where lime has not been applied; and besides, from the land harrowing more freely and thoroughly, the green crop is not only more abundant, but being equal in depth in the soil, springs at once, and shows a more uniform sample; in a word, altogether freer from greens and after-shots. Another advantage is gained, I think, by applying lime to old lea at least two years before breaking up, and that is, the saving of labour, when fallowing for turnips. The lime having lain two years, has the surface soil, as before stated, to a considerable degree tendered; then on ploughing the stubble an inch or two deeper than the lea furrow, the lime will be about central in the middle of the furrow, at work pulverizing the soil, and rendering it, as soon as the season for fallowing arrives, almost as soft and brittle as an ash pit, and saving reploughing, harrowing, grubbing, &c., a sum almost equal in value to half the cost price of the lime.

I must, however, bid adieu to lime, much as I value it, only, as it was my first love, I cannot do so without a parting benediction. Lime, then, I say, wherever practicable on your lea break, and in the summer season; yet such is my regard for it that I say, and say advisedly, rather than allow your farms to remain unlimed, lime by any means, any how, and at any season, betwixt Christmas and Lady Day, and Lady Day and Christmas.

I come now to speak of manure, on which there never has been any difference of opinion as to its being rightly and properly named or classified, and that is, old-fashioned farm-yard muck, and this, I take the liberty of saying, appears to me to be still the best of all mixtures. When I say so, let none suppose I underrate, or am ignorant of the value of the sanitary offals of our large towns and cities; these, I know experimentally, from their large admixture of night soil, &c., are, as fertilizers, all but invaluable; but then it is only in favoured situations—situations not subject to an expensive sea or land carriage—that they are available, and, therefore it is that I leave this valuable accessary to the farmer, out of my catalogue, as they are totally incomatable to a large number of the cultivators, situate within the mountain fastnesses of Cumberland and Westmoreland. To all then I say, especially, and to the farmers of Great Britain generally, that the farmer, be he who he may, who can produce the largest quantity of farm-yard manure in connection with the best quality, will very soon be found standing forth as the leading and most successful (other things being equal) agriculturist of his day and district. Now, there are various ways for doing this, that is, for swelling the manure heap, and also for increasing its value, and, I believe, there is none better, whilst, at the same time, I fear, none more overlooked and neglected by us all, than the properly securing the urine of our stalls and byers; this, in place of being conducted to some convenient receptacle, any one passing along our highways may have observed, in nine cases out of ten, finds its way to the horse pond or goose dub, rather than the manure manufactory. Now, in this, it is self-evident there is great waste, when buildings are not spouted round, for carrying off rain water; and landlords should be reminded this is expected from them, and being accomplished, then the occupying tenant must see that there are proper cesspools, or reservoirs, formed in some convenient place, into which he must deposit road-scrapings, chaff, dried peat moss, &c., at all convenient seasons, and then, into and upon them the conduits from the byers and stables must play. After being thoroughly and completely saturated, say for a few weeks, then let the sluice or valve be uplifted (for I would have an outlet from the lowest level, same as a mill pond), for allowing the water to escape, and the mixture to dry; and so soon as removable in a cart, then away with it, either to the meadow or arable fields. Here, if anywhere, is the place for the water cart to be called into requisition. On lifting the sluice of the cesspool, the waste water might be distributed by the cart over the meadows or pasture fields. I am not, however, an advocate for the distributing cart—not because I lightly value urine as a top-dressing, but only because of the difficulty attending it, and the irregularity of its application. I am aware it is, and has been practised to a considerable extent on many farms; still, on the most of farms with which I am acquainted, it has been abandoned, for the reasons described. On the other hand, were it used by being absorbed in the cesspool, or compost heap, as recommended, there is scarcely a farm where there are not abundant materials for the absorption; only it must be remembered, as already stated, that rain water from the roofs of the houses, and the springs from below, are not to gain admittance to it; and were this carefully attended to, I question much if a world of unavailing deputations might not have been spared repairing to Her Majesty's government, for the purpose of urging them to use their influence with foreign powers to give us artificial manures, guano, and such like, at a cheaper rate. Another plan for swelling the manure heap, is by rotting under and around our animals a large portion of our straw. I am aware a very extensive practice prevails along these fell sides, of making all or nearly all the fodder of the farm pass through the intestines of the cattle. Of course there cannot be two opinions that this is the ready way for getting straw shortened and rotted, fit for application; but its being the best plan for getting quality, must not be so readily conceded. And most assuredly it is the worst of all for producing quantity. Of those who hold by the opinion that dung is best when all or nearly all passes through the intestines of the animal, I ask, What supported nature? Where came the beef, bones, and muscle from? It will be replied the animal had turnips, oilcake, or grain; granted; but if these improve manure with scarcely any straw or litter, they do it vastly more with it; and if none were given the animal fed on nothing but straw, then there cannot be a doubt that the animal has abstracted from the straw what supported nature, and to that extent, at least, reduced its value as a manure.

Perhaps, Mr. Chairman, it might afford a nice subject for discussion some day or other, when we are so much in lack of subjects, whether a ton of chopped straw, that is, a ton of straw fresh and direct from the chaff cutter, or a ton of straw eaten up by an animal allowed nothing but water, would be the most valuable to us as a manure. I might touch upon another mode for enriching manure, by the animal being fed on oilcake, &c.; but this I consider too expensive for general adoption.

Having pointed out the simplest and most efficient ways of increasing the quantity and improving the quality of farm-yard manure, I shall now, as briefly as possible, direct your attention to the best seasons for, and mode of its application. And, here again, I require to make a digression, or at least to ask a question. What sort of soil or class of land is the manure to be applied to? Is it land naturally inclined to produce straw in what (to be understood) I shall call over abundance? or is it the reverse? If the latter, that is, land stinted in the production of straw, then to all such apply the manure to the lea, immediately before breaking up for crop. Land of this description, I have always observed, when any plan or system could be devised—and I know of none and have practised none equal to the application of dung to the lea—for increasing the bulk of straw, always, and without any exception largely increased the quantity of grain. On the other hand, if the soil has a tendency to produce a large bulk of straw—the land I farm is of this description—then, upon no account must the manure be applied to the lea, but to the stubble, at the fall of the year, before giving the land the winter furrow.

At this season there is not the scorching sun, and rarely the withering winds we have about turnip-sowing time, so destructive to ammonia, the most valuable ingredient in dung; and besides, it is generally a period when the day labourer, women and boys, are in lack of employment; consequently, it will be a job for them to spread the manure, and afford us the satisfaction of conferring a favour, nay, a blessing, in an act that in reality costs us nothing, but rather the reverse, for by it we have a more equal distribution of hand labour on our farms over all the year, and thus liberate a large available force, at a very urgent and pressing season, for eradicating twitch and other filth, so unprofitable and so very discreditable to the agriculturists of the age.

Having given my opinion thus strongly in favour of autumn or winter as the season for the proper and economical application of manure, an objection may be started, or question raised, How are we to get it then? This is not difficult to meet, in accordance with a very common practice I have observed in this neighbourhood, and that is, the custom or habit of keeping a large portion of farm-yard manure over the year. This practice I certainly, and out-and-out, condemn; still, as it is a practice, it is better to turn it to a good account, by making it available for a start. I have said, I condemn the system of allowing manure to lie over the year. I do so on the principle that all vegetable substances exposed to atmospherical influence, and in a state of decomposition, become sadly lessened in quantity, and injured in quality, by allowing them to lie over, and thereby run to waste, or fly off in the air, what should be absorbed by and in the soil.

When, however, from any unforeseen or unavoidable cause dung has to lie over the year, then let it, if lifted from the trodden court at all, be carted out into a large heap, and the carts and horses when so engaged go right on to the top of the heap, so that it may be carefully pressed and prevented from decomposition; in this way dung may be preserved for a considerable time without much deterioration or waste, and then turn it loosely up about three weeks before application. My opinion is, that dung is most rich and valuable when it is in a three fourths rotted state, that is, just before it loses the strong decaying heat, which it generally acquires about a fortnight or three weeks after lying loosely up. Some may say, 10 carts of completely rotted dung in a cold peaty state is much more valuable as a manure, and has more substance in it, than 10 carts in the condition in which I recommend it; this is conceded, but that is not the question. Are the 10 cold dormant decomposed equal in value to the 30, or, in many cases, 40, from which they were reduced? I trow not. Nay, I am thoroughly persuaded, from observation and experience, that storing dung over the year is most wasteful and imprudent.

My own system or practice, to have dung at command for the demands of my farm, and up to the extent of its ability in yielding or producing it (for, be it remembered, I am in a locality where none worth naming can be purchased), is to treasure up all that can be scraped together, say from the beginning of March to the beginning of June, for application to the meadow lands; then, my cattle—a considerable portion of them at all events – having access to a large open shed during the greater part of summer, which shed is well littered twice-a-week, makes a very large quantity of excellent rich manure. This is carted into a loose heap, out of the reach of the treading of the cattle, sometime about the beginning of harvest, or on wet days during harvest time, and is fully ready for application immediately after harvest, when I commence to plough my stubble. I have stated my land is not of the description to admit the application of dung to lea; consequently, as soon as all the available dung is laid on to the stubble and ploughed in, I drop ploughing stubble until I get more ready. Every month I clear out my loose cattle courts, mixing it loosely up with stubble and byre dung; and this, by lying a fortnight, then turning over, and allowing it to lie for another fortnight, is ready for use; consequently, a few acres of more stubble are got turned over, and so on continuously during the winter months, or until all the stubble is dunged.

I need scarcely remark, that placing the dung heap near the cesspool, and giving it a complete and frequent watering therefrom, adds very materially to the value of the manure. I have heard the practice objected to, of allowing cattle to get into courts during summer, as it is robbing the grass fields of their valuable droppings, and especially during hot weather, as then they are almost constantly in the courts, only taking a turn-out in the evenings and mornings, to eat, and immediately retire again under cover; and even, whilst parties don't go to the length of objecting, still they only admit it, when I talk of the valuable dung I make in this way, that I was robbing Peter to pay Paul. Now I grant I am doing so in a measure and to a limited extent; yet, if I can persuade Paul that he is as well off at a certain season of the year with 5s. in the pound as at another with 20s., Peter, I think, will have no cause to find fault with me when I present him with Paul's full discharge. Whilst, however, I advocate the application of dung in autumn and winter, let it not be imagined I advocate the sowing of turnips without anything in the stetch below them; no, far from this: this is the place and position for the artificials, bones, guano, &c., to occupy. In making up your stetches, make them equally deep as for dung; then either sow the artificial, whatever it be, broadcast or along the stetch; it is of no consequence which, as the resplitting of the stetch sends the manure to the centre and bottom, immediately underneath where the young seedlings are to be deposited. Of course, from its depth, it is out of the reach of the young plant for a time, but only for a very short time, and at a time too when not required, as the land having been so lately manured, either on the lea or stubble, is in a fine rich state by the thorough decomposition of the manure, and its complete incorporation of the soil; this immediately pushes forward the young plant into the rough leaf, and beyond the ravages of the fly, and as soon as it catches the rough leaf, its fangs may be assumed as clutching at the artificials.

If, however, farmers are averse to change the system of applying their farm-yard manure to the roots of the turnip, then there is certainly no natural necessity for their likewise clinging to the wasteful and slovenly habit I have observed followed, even by those from whom I should have expected other and better arrangements. The practice I allude to is that of stetching up, as is often the case, an entire field, then dunging the half or the whole of it, as the case may be, then spreading, or scaling it, as it is called, then resplitting the stetch, covering in the manure, and last of all, and after a day or two elapse, the turnip seed is sown. Now this practice or mode of procedure I cannot sufficiently condemn. In the first place, as is generally the case, the turnip sowing season is the one when we have the sun the hottest and most scorching; and in the second place, we have often withering spring winds, each of which are fitted almost to blast the expectation of the turnip striking altogether. In fact, I often wonder when I see the stetch seemingly made up for the purpose of withering any latent moisture that may be in the soil; then, again, when I see the dung first lying perhaps a few days in the heap, then when sufficiently dried, spread out along the stetch, to lie for a day or two longer, in order seemingly to perfect its destruction. Then comes the plough, as soon as both dung and land are so baked as to be impossible for covering up, and does its work: after which, and perhaps it may be a week, the seed is deposited, and then the slovenly and wasteful practice is ended.

The remedy I propose for this rude, primitive, and wasteful practice is just the one universally followed in every well-cultivated district, where the dung is applied in the stetches to the turnips. Whenever a field is ready for stetching up, then at whatever side of the field you mean to start, let twelve stetches be made for a beginning. It is always advisable to start at the side furthest from home, or from the manure heap, as by so doing there are no loaded or empty carts passing and repassing each other, and often treading and trampling the finished off and sown stetches. Twelve stetches being set off, calculate your forces—so many carts for manure, so many women or boys for scaling, and so many ploughs for stetching in the manure, and a horse and a man for the seed drill, if your force will allow of it. As soon as the cart is filled with manure, let it be dragged out along the stetches, in quantity sufficient for three stetches at a time, and an active man will do this without ever stopping the horse. Then let the spreaders proceed in sets of three, each spreading their own stetch so many yards lengthwise; then another set, and so on, until all are at work, and always spreading backwards and forwards along their given quantity of yards, each set keeping by themselves. Then let the ploughs start—by the way, there is no necessity for double mould-board ploughs if this plan is adopted; the common one in daily use does the work much better, with only the small addition of an extra near-side plate attached to the plough, with two screw bolts for bringing the stetch to a narrow point at the top. I have said I prefer the single to the double mould-board plough; for this reason—the double plough works in the soil something like a wedge, and pushes all the hard, clotty, stubborn soil immediately underneath, where the young seeds are to be deposited; whereas the single plough cuts through, and throws up from the bottom of the furrow the moist and soft soil so necessary for the growth of the plant in its earlier stages. If the field lies upon a hanging bank, then let all the ploughs, following one another, each split a stetch over the hill, down bank. When at the bottom or end of the stetches, let all make another—a new stetch up the hill, or up-bank, as it is called—which will always leave the number of twelve stetches between, and ready for the cart and spreaders, without any risk of collision or causing them to interrupt each other. I have frequently had six ploughs following each other in this manner, always making six stetches the one way, and covering-in six the other, without any incommoding. A field going forward in this way, with large forces, has almost the resemblance of intricate machinery; and yet the very intricacy, every wheel performing its proper functions, keeps the whole in perfect harmony and working order. Be it observed, if this system is adopted, and properly and energetically carried out—ribbing *out* and *in* as it is termed in Scotland—a great advantage is gained in dry and scorching weather. A stetch is never lifted from the flat above half-an-hour until it is dunged, spread, resplit, and the seed deposited—in fact, all completed—which is a great advantage in any weather, particularly in a hot, dry, withering season.

It was remarked by a friend, when I consented to take up this subject, that I had made several experiments with manures, last season. I did so, and whilst I regret that the boisterons and ungenial autumn of that year prevented me testing them with the certainty of weight, yet the difference was so manifest to the eye, in favour of blood and bone manure, over ten other sorts, that I can have no difficulty in awarding to it the palm of victory. The kinds used were Peruvian guano, bone dust, bone meal, dissolved bones, concentrated manure, blood and bones, and various mixtures or combinations of the above.

One remark, and I have done, for I really confess my paper has extended to a most undue length—and that is, in reference to the manuring of meadows. I have already defined the period on an agricultural farm for making dung for meadow land—that I have shown to fall upon the spring months. Let the dung be exceedingly well prepared by repeated and re-repeated turnings and waterings, and if practicable, from the byres and stables, and also, if attainable, road scrapings, rich soil from any land end, or anywhere else, let it be mixed up with dung, as anything of that sort from its weight and attraction to the roots of grass, causes, in an almost incredibly short time, the growing in of the entire mass, and which early growing in is so essential for the succeeding crop.

Of course, speaking on this point. I do so with very considerable diffidence, for I honestly confess when I entered the sister-county a few short years ago, on this matter I had all my experience to collect and learn, and the result of that experience and observation leads me to point to autumn as the proper and beneficial season for application. Some practise, and recommend strongly, the application of dung immediately after cutting their hay crop; and I believe, in late and high lying districts, the arguments they adduce in support of what they practise, are difficult to overcome; still on the whole, looking at this county and Westmoreland generally, I am disposed to point to September or October, as the best season for applying manure to meadows: then the sun is shorn considerably of the force of his burning rays, the nights are getting longer, and in the absence of rain, for which, at this season, I believe few agriculturists pray, there are generally very heavy dews, and of course very considerable growth for speedy growing, in or over, as it is called. And in addition, by deferring laying on the manure until this season, a rich and valuable aftermath has been secured at a season of very great scarcity. But whatever be the season embraced for laying on the dung, never, if possible, let the sun set on a slovenly or unspread heap, either on meadow or arable field.

Thus, sir, have I brought at greater length than I could have wished, my observations on manures, and their application to the soil, to a close. In doing so, I am aware, on several points, I have ventured to find fault with and condemn the established custom and present usage of the district; this I admit should be at all times cautiously meddled with, by any one, more especially a comparative stranger; for often do we find, on further, deeper, and more searching investigation, the why and the wherefore it is so. Still, whilst admitting this, as little does it become those who have carefully collected experience and observation from the best-cultivated counties in Great Britain to stereotype any system that has nothing but custom and ancient usage to recommend it. At all events, I take the liberty, Mr. Chairman, of saying, with your permission, that I shall not be the man.

A TREATISE ON ROAD LEGISLATION AND MANAGEMENT.

By Richard Bayldon, Road Surveyor.

London: Longman and Co.

Roads are a fundamental provision for the convenience and improvement of any country, its traffic and the internal employments. The public highways that lead from one city to another, the roads of the parish, that afford access from hamlet to hamlet, the cartways of the farm, that give a passage to the fields, and from one division of land into another, the walks of the garden, that conduct to the various parts, have all been contrived for the same use, and with the same object in view, being spaces of ground ridden over, and trodden upon for purposes of public and private utility. Without these provisions of access, the value of distant parts cannot be realised, and the mutual benefit is denied, from which the social happiness of mankind derives the largest share of contribution. Without intercourse, human progress would remain stationary, and become a stagnation, having neither ripple nor movement.

The formation and maintenance of public highways have long been made a national concern, and have been subjected to legislative enactments. The cartways of the farm belong to the landowner and the farmer, and each parochial division manages the roads within its boundaries by a tax of money or work, and by officers for the special purpose. The great highways are placed under a wholly different jurisdiction. Being used for universal purposes, a tax is levied in the shape of tolls, on every passage over the road, which is applied, under commissioners and surveyors, to the first provision and to the future maintenance of the roads. As in many similar cases of legislative and financial applications, ignorance and carelessness have produced debts on the turnpike trusts, and the usual concomitant of a very inefficient condition of the roads as a public accommodation. Debt and inefficiency almost ever accompany each other, being the producer and the produced in a regular series of connexion.

For the purpose of removing and preventing both these evils of debt and inefficiency, we have now before us a treatise on road legislation and management, which in our opinion evinces no ordinary powers of practical discrimination, and original suggestions on the subject that is treated. A very extensive professional experience forms the ground work, which, along with a clear discernment and an enlightened judgment, constitutes the excellence of every progress that is attempted in any art or mixed science. In no art has it been more fully displayed than in the present treatise. The author's views on turnpike debts and payment of arrears are truly sensible and most highly honourable; he yields to none in wishing all debts to be extinguished, but requests time for the gradual liquidation, and the original rate of interest to be upheld. The terms proposed are fair and just, and strictly possible, as has been proved by trusts under his own care. An attentive perusal and consideration of this section of the work is most worthy of recommendation.

Twelve model clauses that are proposed to be introduced into all new turnpike road Acts, suggest the economical and proportional rates of charge on vehicles of carriage weight, of which the justice seems undeniable.

The author recommends the removal of toll-bars from the streets of towns and from the vicinity, thus avoiding the production of "Rebecca" feelings by an accumulation of bars and gates. The revenue required for the repairs of roads to be raised by a uniform rate, of a wide area, over the districts in which the bars are situated. This is a most sound policy over the present arbitrary divisions of townships or parishes.

The evils of letting road repairs by contract are briefly but clearly exhibited, lumping-sum contracts ever producing imperfect executions of work, although smaller specifications, that can be measured and minutely inspected, are let out, as work under contract, to do a certain quantity at fixed prices.

Our opinion most fully agrees that materials for repairs be laid on roads during the dry weather of summer, and not in winter as is usually done. In the latter case the materials sink into a soft bed that yields to the pressure; in dry weather the broken stones are placed on a dry bed, and set or cemented into a position by using a blending material, which is pressed together by a heavy roller, being first treated with a watering, if no showers fall to moisten and damp the mass. A pretty extensive experience with parish and farm roads gives a most unqualified assent to this practice.

The road-sweeping machine is used, and the saving over hand-labour to be applied in making dry and clean side-paths for travellers.

There are given in this work several tabular forms of accounts, most ingeniously contrived for practical use. The regulations and rules for workmen on roads, by the day or in contract, are very just and prudent, and prevent any quarrels or misunderstandings. A most useful table is given of the width and depth of road materials, of toll collectors, weekly returns, and district men's labour account, with an account of tolls received, and cost of repairs, other expenses, quantity of materials and depth, scraping expenses, the debts (increase and decrease), and the net amount. An explanation is given of the tables, with a notice of the statute duty due from parishes to turnpike trusts, in which a rate of money is charged on the rental.

Mr. Bayldon has displayed in a very full extent the first, the second, and the third requisite of authorship—a thoroughly practical and judiciously enlightened knowledge of the business he engages to illustrate, with a modest and candid statement of views and recommendations. He has compiled a work that is equally useful to the commissioner of roads, the surveyor, contractor, toll-collector, and the labourer; each party will find a valuable something for their direction. This varied utility forms a high recommendation. And he has done very great credit to the relationship with the author of "Rents and Tillages," where sound practice and enlightened views have carried the work into seven editions with an unqualified approbation. The present work is a most worthy companion.

WAREHOUSING OF WHEAT.

Sir,—I lately observed some remarks in your excellent paper on the warehousing of wheat, which recalled to my recollection a plan I adopted, many years ago, with a cargo of 500 qrs. of wheat, which succeeded admirably. I will first state the reason for adopting the plan. I had seen numerous instances where wheat was put into granary, say, for one or two years, and, at the end of the time, I have found the wheat with a chamber smell, and full of weevils, and a loss of condition from three to five shillings per qr. The following would be something like the charges and loss on the old plan :

	£	s.	d.
2 years rent on 500 qrs, at 4d. per last..	85	18	8
Turning and feeing for 2 years	10	0	0
Loss in condition, 3s. per qr.	75	0	0
Loss in measure from weevils, &c., price £2 per qr.—one per cent............	10	0	0
	£180	18	8

The loss of condition and the weevils is caused by exposure to the damp atmosphere of our uncertain climate which acts as follows:—The surface of the wheat imbibes moisture; then comes the warehouseman and gives it a turn, putting the damp below, and bringing up the dry grains to undergo the same process; and so a fine dry parcel is used, until the whole is lowered in condition, and rendered a very fit receptacle for all the moths that choose to fly in at the open windows, to deposit their eggs, &c. I determined to exclude damp and weevils at the same time by adopting the following plan: 500 qrs. of wheat was put into my hands to warehouse, probably for a long period, as the old corn law was in force. The management was left entirely to my discretion. 50 qrs. of the wheat was dried over a clear slow fire, and, when cool, carefully mixed with the bulk; the 50 qrs. was not dried for being damp, for the whole cargo was in excellent condition, and weighed 63 lbs. per bushel, but to enable the bulk to be laid above six feet thick. The windows were boarded, and carefully matted to exclude damp air and light. The wheat was then trimmed above 6 feet thick; the door of entrance, which opened into another store, was also matted up, and thus it remained for more than two years. I had it tried each year by a corn tryer, through slides in the floor above. When sold and measured up, I never saw a parcel of warehoused wheat that had kept so well, free from smell, and weevils; and, in measuring the bulk, all run freely to bushel. This cargo was shipped from this port to Havre, in France, and Messrs. Lafeette and Co. were so gratified with the condition of the wheat, they sent me a case of very superior claret as a present. The following was the entire cost incurred upon the wheat:

	£	s.	d.
Drying 50 qrs	1	5	0
Mixing and trimming the whole	1	0	0
The wheat laying thick, and not requiring turning, occupied less than half the usual floor, and a store was let by the year at £20. Two years..........	40	0	0
Matting windows and labour..........	0	10	0
Screening over when measured up......	1	0	0
Loss in measure, 12 bush.	3	0	0
	£46	15	0

It is of the utmost importance to the agricultural interest that a safe system of storing corn should prevail. Capitalists would not then object to invest money in wheat, as they now do on account of the expence and loss in condition. Had I wheat now to warehouse, I think I could improve upon the plan. I shall be happy to reply to any inquiries that may be made upon this subject.

I am, sir, your obedient servant,

B. S. Sawden.

Budlington Quay, King-street.

GREEN CROPS FOR MANURE.

I am much gratified to notice the increased attention which is being accorded by farmers generally to this subject. Every one, in fact, who examines this subject attentively, must be speedily convinced of its utility, especially when turned in as an enrichment of exhausted soils. There is obviously no method by which the agriculturist can economise more, or more rapidly increase the fertility of the soil, than by turning in, as a dressing, such crops as derive a portion of their aliment from the air: no matter how impoverished or sterile the soil, he may, by a judicious and persistent pursuit of this means of amelioration, easily make it rich. There are many plants well-adapted to this purpose, among which are millet, buckwheat, peas, and clover, all of which are highly valuable, operating both mechanically and chemically, by their decomposition upon the soil, especially when containing much acid.

But it may not be improper here to remark that in making choice of crops to be turned in, we should invariably give preference to such as derive at least a portion of their pabulum from the air. The vegetables enumerated above are all of this class, and consequently take much less from the staple of the soil than those which are of course less adapted to this use. Of these, buckwheat and clover are perhaps the most valuable —the haulm being more vigorous, and at the same time much more succulent, and yielding much more readily to the laws of chemical affinity when inhumed beneath the soil. There is also another cause of preference, particularly in the case of buckwheat, the crisp nature of its stalk contributing greatly to the facility of turning it down, especially where the roller is used to precede the plough. On very poor land buckwheat may be grown with better success, perhaps, than any other grain crop, and will produce a more abundant yield both of haulm and grain. When sown to be turned in, unless the soil is calcareous to a degree rendering it unnecessary, the application of quick lime before turning in the wheat will be of great benefit. From two to three casks will ordinarily suffice for an acre; but if the ameliorating process is designed to prepare the land for the production of crops belonging to the order of lime plants, and which require a large amount of this mineral for their successful development, treble and even quadruple the above quantity may be economically applied. It is not of essential consequence whether the application precedes the turning down of the crop, as is accorded subsequently, the principal object being to supply an important constitutional deficiency to the interests of the operator by limiting the acreable product of the crop.

Clover is preferred by many to all other crops for this purpose, and, taking all things into consideration, it is, perhaps, not easy to say where preference should rest. The quantity of soluble matter contained in the clover plant, when arrived at the period of inflorescence, is unquestionably large—larger, probably, than in most other plants. Its roots, also, when mature, are large and succulent, and contribute very materially to the fertilising effects of the crop when turned down at maturity; but it will be seen that where a speedy amelioration is required the plants do not commonly have time to attain their maximum development, and every one is aware that, in its youthful state, the clover plant contains a far larger quantity of fluid than of solid matter. Millet, if sown broadcast, will probably produce a greater quantity of readily soluble matters than either clover or buckwheat; but whether its fertilising action upon the soil is so great is a question that remains to be decided: one thing, however, may be relied on as certain—any plant produced by the soil will, if turned in by the plough, contribute more or less to its enrichment. The families of the yuccas, and even the comparatively worthless cryptogamous vegetation, which is produced parasitically on rocks and in boggy swamps, have been ascertained to possess principles favourable to vegetable development, and when reduced by putrefaction, of aiding, very essentially, the phenomena of vegetable life. Nothing, in short, is worthless, in the great laboratory of nature; and it is there, over the crucible and alembic, that we receive these important lessons which so materially assist us in the numerous and multiform duties of practical life; here we discover the adaptation of means to ends, and become familiarised to the operative principles and laws with which we were before perfectly unacquainted and scarcely deemed to exist.—*Germantown Telegraph*.

LADY-DAY CORN AVERAGES.

SIR,—As at this period of the year it may be interesting both to your agricultural and general readers to know the average prices of wheat, barley, and oats in England and Wales for the 52 weeks ending on the 27th of March, 1858, I beg to annex the weekly averages from the *London Gazette*, and to state the result, which is as follows:—Wheat, 53s. 10d. per imperial qr.; barley, 39s. 11d. per imperial qr.; oats, 24s. 10¾d. per imperial qr.

In the annexed return it will be observed that the highest price of wheat was on the 17th of July, 1857—viz., 63s. 10d. per imperial qr.; and the lowest on the 26th of February, 1858—viz., 44s. 6d. per imperial qr.

The fluctuations in the price of wheat since the passing of the Corn Bill on the 26th of June 1846, may be seen in the following abstract:—

In the year ending	Average Price.		Highest Price.		Lowest Price.		Difference.	
Michaelmas 1847	71	3	102	5	49	6	52	11
" 1848	51	3	56	10	46	10	10	0
" 1849	46	7	52	3	41	9	10	6
" 1850	40	3	44	1	36	11	7	2
" 1851	39	5	43	6	36	7	6	11
" 1852	39	10	44	9	35	6	9	3
" 1853	45	7	59	5	37	10	21	7
" 1854	72	10	83	3	52	2	31	1
" 1855	71	10	78	2	56	7	21	7
" 1856	73	1	83	1	64	4	18	9
" 1857	59	2	66	4	53	0	13	4

I remain, sir, your obedient servant,

CHARLES M. WILLICH,

Actuary, University Life Assurance Society.

25, *Suffolk-street, Pall-mall, S. W., April 5.*

WEEKLY AVERAGE PRICES OF WHEAT, BARLEY, AND OATS IN ENGLAND AND WALES FOR 52 WEEKS, ENDING MARCH 27, 1858.

(From the *London Gazette.*)

			Wheat.		Barley.		Oats.	
			s.	d.	s.	d.	s.	d.
April	10,	1857..	54	8.124	47	3.490	23	6.297
"	17,	" ..	53	11.034	45	9.378	24	4.209
"	24,	" ..	53	0.271	44	7.130	23	5.978
May	1,	" ...	53	2.494	43	7.751	22	9.074
"	8,	" ..	54	3.661	43	4.355	23	3.800
"	15,	" ..	55	10.934	43	5.895	23	3.455
"	22,	" ..	57	5.367	43	6.934	24	9.349
"	29,	" ..	57	9.340	42	8.857	24	11.097
June	5,	" ..	57	8.242	41	10.577	25	3.800
"	12,	" ..	58	9,332	41	8 344	26	2 977
"	19,	" ..	60	0.794	38	9.678	26	5.348
"	23,	" ..	60	1.469	38	11.225	26	7.971
July	3,	" ..	61	6.004	37	7.360	27	9.148
"	10,	" ..	63	5.140	39	0 967	27	3.979
"	17,	" ..	63	10 425	37	8.150	27	2.259
"	24,	" ..	63	8.028	37	9 505	27	9.493
"	31,	" ..	62	7.113	38	3.447	27	8 699
Aug.	7,	" ..	59	8,318	38	5.031	28	7.780
"	14,	" ..	58	10.281	39	1.641	28	2.760
"	21,	" ..	59	2.255	40	0.043	27	8.831
"	28,	" ..	59	10 023	39	10.737	27	11.516
Sept.	4,	" ..	60	4.881	42	8.239	27	8.491
"	11,	" ..	58	4.365	42	7.444	26	7.679
"	18,	" ..	55	8.870	42	5.774	26	1.713
"	25,	" ..	56	9.270	42	3 873	26	5.202
Oct.	2,	" ..	57	6.529	42	11.368	25	6.394
"	9,	" ..	56	3 726	43	4.817	27	0.229
"	16,	" ..	55	8.979	43	0.657	25	6.884
"	23,	" ..	55	10.801	43	0.872	25	6.319
"	30,	" ..	55	6.971	43	5.991	25	3.096
Nov.	6,	" ..	53	11,645	43	1.090	25	0.965
"	13,	" ..	52	6 314	42	3.176	26	4.148
"	20,	" ..	51	8.876	41	3.487	25	3.447
"	27,	" ..	51	3.527	39	10.066	24	1.550
Dec.	4,	" ..	49	8.154	37	7.179	23	10.064
"	11,	" ..	48	3.913	35	9.824	23	0.352
"	18	" ..	49	5.408	36	5.330	23	3.704
"	25,	" ..	49	3.694	37	0.894	22	8.789
Jan.	1,	1858..	47	5 758	35	11.915	23	2 717
"	8,	" ..	47	7.882	36	7.575	22	3.424
"	15,	" ..	47	10.765	36	3.985	22	8.057
"	22,	" ..	48	8.451	37	0.637	22	1 596
"	29,	" ..	48	9.845	37	6.838	22	4.480
Feb.	5,	" ..	47	6.940	37	1.166	23	1 926
"	12,	" ..	46	9.337	36	8.262	23	0.718
"	19,	" ..	45	8.896	36	3.917	22	8.069
"	26,	" ..	44	6.449	35	9.159	22	10.484
March	5,	" ..	45	0.375	35	11 227	22	4 719
"	12,	" ..	45	6.149	36	7.289	23	4.271
"	19,	" ..	45	3.390	36	6.920	23	3.968
"	26,	" ..	45	6.654	36	9.511	23	4.510
April	2,	" ..	45	2.398	37	3 507	23	4.724
		52)	2,799	11.861	2,075	9.484	1,295	4.579
			53	10.150	39	11.028	24	10.93

SUMMER AND WINTER TREATMENT OF CALVES.

In your excellent publication of date the 13th instant, "A Subscriber" complains that he has been losing his calves in a ten acre field of dry grass, with shelter sheds, "close to the north-east side of the cottage-houses, sixteen in number." Your correspondent states that, instead of growing like "mushrooms," as he expected, the calves in a few weeks commenced coughing, and went daily back, and that they appeared to die of a decline. You suggest to the "Subscriber" that the north-east exposure was the cause of the illness, aggravated by the smoke of the 16 houses.

Having had for twenty years considerable experience in the rearing of cross-bred calves, and having lately observed that several of your correspondents have put similar questions on this subject, I venture to address a few remarks to you.

The disease which your correspondent describes is evidently bronchitis. It is a most serious one, very common among calves before winter, most destructive to their condition, and in most cases fatal. A good many years ago I lost the half of my lot (40) from this disease, and in consequence my attention was drawn to the nature of the complaint, and the means of preventing it. I called in the aid of a veterinary surgeon (bred under Professor Dick), but he seemed to be able to throw little light upon the subject. We, however, tried all the ordinary cures that are recommended in books, and put setons into the necks of all the calves. I do not think that the north-east exposure would injure your correspondent's calves much if they were kept warm and dry through the night, and at all times protected from bad weather; nor do I think that the smoke of sixteen cottages in a ten-acre field would have any effect. In my own case I became convinced that exposing calves to wet and storm in the months of September and October was the cause of much bad health, and I have seldom found any coughing among those that were housed carefully at night at this period of the year, and not packed too closely, or allowed to lie on wet litter.

A man may put up shelter-sheds, but unless he takes care that the stock are *shut in*, he has no certainty that they remain in through the night and during rain. It is often a very difficult affair to get young stock into sheds early in the season; extra feeding will scarcely tempt them in; but even after they are used to it, they will frequently go into the shed and dance out again after having consumed their feed of turnips or cake. I have very often, after labouring, with the aid of several people, to get young stock into an open house at the darkening, visited them again at night, and found them lying down under the rain in the most exposed part of the field. This is easily accounted for. After eating their food they probably lie down for a while, and then wander out; a storm comes on, and rather than face it they fly from it, and at length find themselves at the end of the field farthest from the shed, where they probably remain till morning. I have known horses wintered in a field with an open house in it, that almost no power could get into the house, although some of them were old brood mares that had been stabled all their lives. I remember hearing of a gentleman of my acquaintance being complimented upon his shelter-sheds for young horses, whose reply was, "Yes, they are very well, but the devils won't go into them," and this has been exactly my own experience. Of course, after a long winter, storm and cold and hunger will force stock into such places; but early in the season, when the grass is green, young beasts will not go into open houses, and this is just the time when young calves lose their condition. Shelter-sheds to be of any use to young stock at this season require to be subdivided and protected by a wall or other fence at least half their length in front, with a hurdle upon the other half, to be shut at night or in bad weather. Young stock should never be put so closely together as to make their beds very damp from urine or the place too warm for their breath.

It is a difficult thing to carry calves well through the first half of the winter. From not being housed in time they are generally allowed to fall off a good deal between August and November, and they seldom recover fully till spring. The best way in my opinion to make good calves (next to letting them follow their mothers) is not to put them out at all the first summer, excepting for exercise, but to confine them to the houses and courts, where there is generally plenty of room when everything else is at grass. If they get plenty of cut grass besides their milk (and cake or meal if you please) they will thrive more rapidly than they would do in the field exposed to sun through the day and rain at night, and will lose nothing at the fall of the year.

Calves reared in this way never have coughs. Calves that are off their milk entirely before going out in June, if protected from the sun through the day (and in sunny weather they will go into shelter-sheds fast enough), often do very well at grass, and thrive rapidly; but as far as my experience goes, those which are drinking milk make bad grazers, and would be far better with cut grass in the courts. Calves are frequently allowed to lose much of their condition whilst learning to eat turnips; and condition, once lost with them, is not easily regained. The common way is to throw the turnips on the ground with the shaws on, and many weeks frequently pass before the weakest of the calves break them sufficiently; and all this time they are kept in a small space of ground, or shut into an open shed, and are supposed to be doing well because they are getting turnips, when in reality they are half-starved If turnips are cut with a sheep-cutting machine, or, what is better, pulped, and given in troughs, stock will eat them greedily in two or three days. The ten-acre field of your correspondent would be very useful as an exercise ground, either in summer or winter. It is not good for the calves' feet or joints to be confined always to soft litter, perhaps wet with urine; but I would not recommend them to be out in winter longer than three to four hours a-day, and this dependent on the state of the weather, and in summer the time of the day should be regulated by the heat of the sun. One very important thing to be attended to is to keep the sheds that the calves are confined in cool and dry, and of an even temperature. I believe that almost as much harm is done to young stock by allowing them to become too warm, as would be done by turning them out altogether.

These remarks are intended to apply to calves crossed from the Shorthorned bull. Galloway and Highland calves, being more hardy, can stand more exposure, and now-a-days the best of both these breeds are allowed to follow their mothers, with whom they remain late in the season, and thus become very strong and hardy. AGRICOLA.

—*North British Agriculturist.*

ROOK FLIGHTS.—I have frequently been very much amused by the conduct of a colony of rooks in the fine elms of our meadow, a few years ago; for I am sorry to say that decay has begun among the trees, and, true to their instincts, the rooks have now nearly deserted their old haunt. When the rookery mustered about fifty pair of birds, the music was in full chorus, and, generally, one or two birds whether from catching a cold or not, I cannot tell, but their voices would break into falsetto, contrasting very prettily with the general harmony of thirds, fifths, and octaves blended together. A very curious custom was followed by these birds in the latter end of autumn and winter. The rookery was only used as a breeding place, and the roosting trees were situated about two miles away, where several colonies would congregate to pass the night. In the morning the whole of the birds betook themselves to their regular feeding grounds and a considerable muster passed over the Maidstone rookery, perhaps two hundred of them. The Maidstone birds would then separate from the grand flight, and drop down to the old familiar spot, where they held a very animated discussion upon some subject unknown to me. In about fifteen or twenty minutes, all would proceed to their feeding grounds with business regularity. In the afternoon if food had been plentiful) an evening visit would take pace; but this was differently conducted, for all sat solemnly perched, and no cawing, nor any disturbance, was allowed This was a Quaker meeting; and after a short time spent in a quiet orderly manner, a gradual dispersion took place in twos and threes, and, before dark, they had joined the metropolis, where would be heard a grand burst of cawing as every detachment arrived. I fully believe that questions were asked and replies given; but I doubt if we shall ever master the rook-tongue. Perhaps a Chinese might make out some of it, but then the grand difficulty would be to understand John Chinaman.—Correspondent of the *Family Friend.*

FOOT ROT IN SHEEP.

This disease is, I believe, but little understood by farmers generally, except those who have been brought up on flock farms, and have made the nature and diseases of these animals their special study, and foot-lameness arising from over-driving, or wetness of pastures, is often mistaken for it. The real foot rot, which is a terrible complaint if you once get it among your flock, is easily detected by a peculiar smell arising from the diseased feet that does not attach itself to the common foot-lameness, although I have no doubt if neglected, that complaint will ultimately resolve itself in the foot rot. The stench arising from the parts affected is so unlike any other that if you once smell it you will never after mistake it, but can no more be described than a Yankee hunter can describe the stink of a skunk. Foot-lameness frequently causes discharge, but not of that fœtid nature that characterises the real disease, and may generally be cured by simple remedies; but if you detect in the discharge an indescribable fœtid smell, depend on it you have got the foot rot among your sheep, and in that case put them on your dryest pastures, or if possible under cover, and feed and fat as fast as you can; but by no means allow sound sheep to come upon the land tainted by the diseased ewes for some time, or the complaint will arise again among your fresh flock, and especially upon wet soils, which seem to retain the power of inoculation much longer than dry ones. It is a difficult thing to get rid of a diseased flock, except by fatting; and it is a very dangerous experiment to sell them to a feeder if you have the slightest symptoms of it among them; but if they were thoroughly diseased it is equally difficult to fat them well; and then, after having found that simple remedies do not check the disease, I should advise the adoption of the following measures, which I have known successful when all else have failed. Let your shepherd examine the sheep singly, and, after cleansing the diseased foot thoroughly, drop on the affected parts one or two drops (not more) of butter of antimony. In two or three days again examine them, and take a small quantity of blue vitriol, and add it to a pint of white vinegar, varying the strength of the dilution according to the violence of the disease, and dress the foot slightly with this mixture. You will soon see that the sheep improves in appearance, it treads more soundly, and the eye gets brighter, having a more fresh appearance altogether. And then with the following ointment—Take of lard and soft soap half-a-pound of each, and simmer gently over a slack fire; add 2 oz. of resin while it is cooling, and when nearly cool simmer again, adding, while simmering, a quarter of a pint of green oil; while it cools, put in a small bottle of balsam from the chemists, and stir the whole until it is thoroughly mixed. This plan, although tedious, will cure your sheep, but do not trust them again or breed from the ewes; fat them off at once, and get a fresh flock. The ointment is extremely useful to keep by you during the lambing season, as, after straining, it allays inflammation by application to the parts, and in difficult cases facilitates the getting away of the lamb.

A FARMER.

—*Sussex Express.*

CALENDAR OF AGRICULTURE.

The planting of beet and potatoes must now be quickly finished, if any remain undone from last month. Horse and hand-hoe all drilled crops: allow not a single weed to be seen.

Turn over the heaps of winter-prepared dung; and fermentation will readily commence. During its progress, lay the dung in drills. Reverse the ridglets, and sow the seeds of Swedish turnips immediately, which will derive much benefit from the near contact with the fermenting dung. In the first place sow common swedes, then Laing's and Matson's Hybrids, and follow with Aberdeen Yellows. In dry weather, roll the drills immediately: in moist, showery weather, it may not be required.

Plant cabbages, kohl-rabi, savoys, and winter broccolis from the seed-beds, on drills three feet apart, and the sets two feet asunder along the drills. Apply very moist half-rotted dung in a large quantity on strong clay loams, and dibble the plants into the ground during the wettest weather in which work can be performed, as the plants require much moisture. Fill up blanks with fresh plants, in order to procure an even crop. Sow early turnips for an early crop, as Tankards and whites; and sow rape, to be consumed on the ground, as preparatory for wheat.

Pare and burn rough lands, and spread the ashes, in order to cool their warm condition. Prepare the fallows for green crops, and also clay fallows for wheat.

Stall-fed cattle will now be disposed of—the fat animals to the butchers: the leaner will go to the pasture-fields, to be fattened on grass; but the milch cows to pasture of permanent grass, adjacent and convenient, provided with water and shelter, and improved by frequent top-dressings and the sowing of clovers and of strong perennial grasses. But a rich natural quality will not require any assistance. The oldest calves may go to the grass paddock; and if the grass be scanty, assistance must be given in racks, with clovers and vetches. A shelter-shed and a supply of fresh water are indispensable.

The latest lambs will now require much attention, and must have the best pasture on the farm, in order to raise an equality with the foremost. The equal condition of animals, as well as the breeding, shows the proper management of animals.

The ewes and lambs that are eating vetches and rye must have fresh food every two days. Begin the soiling of horses and cattle in the yards. The milch cows will need assistance in green food, if the pasture be scanty. Feed the store pigs with clovers and vetches; and afford ample littering to all animals. As the early soiling green crops are consumed, plough the land for turnips.

Put mares to the stallion, and get colts; though this operation may be more safely performed the previous autumn.

Finish the sowing of grass-seeds on the barley-tilths. Sow by machine, and cover with light harrowing and a heavy rolling.

Dig hop-plantations, and tie the bine to the poles. Shut up watered meadows for hay.

Wash sheep by hand in a clear running stream; and, for preventing the maggot-fly, sprinkle the animals from head to tail, from a dredging-box, with a mixture of hellebore-root powder and of black brimstone—½lb. to 1½lb.

Weed young quicks. Set thorns in hedges, but not to expose the roots quite bare to the sun's rays in dry situations. Rather leave the weeds to moisten the roots, provided the upward growth be not checked.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BLAIRGOWRIE FORTNIGHTLY MARKET was well attended, but business was dull. There were 124 cattle on the ground, the best of which sold at from 6s. 9d. to 8s. per stone. Milch cows were on demand, and sold readily at from £6 10s. to £12 10s.

CHESTER FAIR.—The supply of milking cows and young stock was large, but not a fat beast was to be seen. The prices for sheep and barrens were a shade higher. In the horse fair there were some good animals, but the business was not brisk.

CORWEN FAIR was very well attended by buyers. A great number of cattle was exhibited, and there was a better demand for barrens than for any others, their prices varying from £9 to £11. Few horses were shown, and those not being of the best qualities, but a small business transacted. Store pigs were lower than usual; sucklings from eight to ten weeks old, from 7s. to 10s.

DEVIZES FAIR was very largely supplied, sheep only being an average number, about 5,000 having been penned. The sheep, which were mostly tegs, sold at from 30s. to 36s. each; and couples at from 42s. to 48s.; the trade being rather better than at late fairs. There were a few fat sheep, shorn, sold at 6d. to 7d. per lb. The supply of heifers and calves was very large; trade was dull, and prices 25s. to 30s. a-head lower, from £15 to £20 being about the range. Beef sold at from 10s. to 11s. a score. Horses were numerous, and of all qualities, except the best.

DULOE FAIR.—There was a good supply of well-fed cattle, which found a ready sale at £3 per cwt. for beef, and 7½d. per lb. for mutton. The fair being remarkably brisk there was a good amount of business done.

EAST GRINSTEAD FAIR.—Business was brisk in horned stock. Yearlings and two-yearlings were in demand, and there was an improvement in prices. Fat stock was not so, and rather hung in hand; sheep were sought after, particularly good Downs, but the samples of sheep at the fair were not of that character. There was a short supply of good cart colts. Pigs were not so numerous as usual, and prices were rather lower. On the whole there was a good share of business transacted, and trade was brisk.

FENNY STRATFORD FAIR was the largest we have seen for many years. A great number of cattle, sheep, and pigs were on sale, most of which changed hands.

GLOUCESTER MONTHLY MARKET was well supplied with every description of stock. The beef trade ruled heavy, and the number of sheep penned was fully equal to the demand. Beef, 6d. to 6½d.; mutton, in the wool, from 7d. to 7½d.; shorn sheep, 6d. to 6½d. per lb.

LINCOLN FAIR, as far as business is concerned, shows a decided falling off. Up to Wednesday night less money had changed hands than had been known for many years. The attendance of horse dealers this year has been very large, including all the principal English and continental buyers. France was largely represented—far more so than during the Crimean war, and this may be taken as an indication of the high estimation in which English horses are held among the French breeders. The business on Monday was confined to first-class animals, which, however, were by no means readily to be met with. Second and third-rate hackneys and carriage horses were a drug, dealers refusing to comply with anything like the demands of sellers. The business was throughout the day extremely slow. On Tuesday, owners of second-rate horses still refused to accept the prices offered by buyers, and the business effected was limited. On Wednesday there was a very large show of horses, the unsold ones and the new arrivals, which consisted chiefly of cart and farm horses, making the supply far more than equal to the demand. As the day progressed, a little more life in the trade was manifested, and several good hack horses changed hands at prices ranging from £30 to £50. All but the very best hung heavily, and prices for all descriptions must be quoted fully 20 per cent below the prices of last year. The sheep fair on Thursday was a very large one: at least 60,000 were penned. The average quality was decidedly good, far better than could have been expected, considering the long dry season and the scarcity of keeping. In the early part of the fair, prices ranging from £2 to £2 16s. per head were demanded, the high prices of last year evidently being very prominent in the recollection of sellers; but prime wether hogs of the same description which last year commanded prices as high as 70s. per head, could not be sold at a reduction of 30 per cent. The business done, however, was very limited, and nearly half the pens remained unsold at a late hour. The current prices for good useful hogs were 40s. to 45s. Mr. Howard, of Dunholme, sold a pen of splendid hogs for 56s. a head. There was a good show of fat sheep, which sold at a slight decline on the prices of last market day, the extremely hot weather causing the butchers to purchase with caution. A few lamb-hogs were in the market, but the high prices asked were not paid. As a whole, the fair must be pronounced the dullest known for many years past.

SHIPSTON-ON-STOUR FAIR was well supported, but trade was dull, owing to the great reduction in the value of first-rate horses; prices varied from £25 to £60. There was also a good supply of sheep and cows; beef realised 6d. to 6½d.; mutton, shorn, 5½d. to 6d. Some pens of sheep, sold by auction by Messrs. Ball and Son, the property of Mr. Sheldon, of Brailes, realised 69s. a-head.

SOMERTON FAIR was not so large as usual, and prices generally ruled dull. Fat beef from 9s. 6d. to 10s. 6d. per score; fat sheep, 6d. to 7d. per lb.; cows and calves,

£11 to £15. There was a large quantity of pigs penned, and lower prices than of late had to be submitted to, to effect sales.

TENBURY FAIR was well supplied with stock. There was a good attendance of butchers and dealers, and rather better prices were realized than at recent fairs. Beef averaged fully 6d. per lb. Barren cows were dear, and cows and calves made satisfactory rates. There were not any fat sheep on offer, but good couples met with purchasers.

TEWKESBURY FAIR was well supported, but the greater part of the business was transacted through the hands of the auctioneers. Messrs. Weaver and Moore sold upwards of 560 beasts, and Messrs. P. Thomas and Son also sold a large supply of stock. Beef sold at from 5d. to 6d.; mutton in the wool, from 6½d. to 7d.; shorn, 5½d. to 6½d. per lb.

TIVERTON GREAT MARKET.—The brilliant weather did not appear to operate as an inducement to graziers to send their cattle to market. The number of bullocks driven was hardly equal to an average. Owing to the small supply and the extensive demand, beasts of good quality went off freely. The prices obtained were, however, rather below those which were realized some time since. Fat bullocks were not plentiful, and sold readily at from 9s. 6d. to 10s. 6d. per score. There was a tolerable show of cows and calves, which fetched from £12 to £17 a-piece. Barreners were worth 7s. per score. The few working steers exhibited were quoted at £36 per pair. There were not a great many sheep penned. They were disposed of at remunerative rates. Fat wethers 7d., fat ewes 6d. to 6½d. per lb.; store hogs 35s. each; butchers' calves 5d. to 6d. per lb.; rearing calves £1 5s. to £2 each.

TOWYN FAIR—The attendance was far more numerous than was anticipated, as in consequence of the delightful weather the farmers were busily engaged sowing. The supply of stock was not large. Two-year-old steers realized from £7 to £8; cows, in-calf, from £12 to £14. The supply of horses was very meagre; some entire animals were exhibited, and appeared very strong and useful.

WINSLOW FAIR.—A good supply of beasts, sheep, and swine, and a numerous attendance of graziers and dealers. The cow stock was remarkably good, especially the heifers, some of which made from £18 to £20 each, but the trade was generally speaking dull; pigs a slow sale, at moderate prices; a poor supply of horses.

WALES CATTLE FAIRS have been held at Carmarthen on the 15th, at Langathen on the 16th, and at Landovery on the 17th of this month. There was a fair number of store cattle for sale at each of those places. There was a full attendance of dealers, and nearly the whole of the stock were sold at about ten per cent. lower than at the same fairs this time last year. Cows with calves were rather scarce and commanded high prices. Fat cows were in fair supply and demand at fully late rates. Horses and colts were rather scarce and in fair demand, but at low prices. Pigs continued in good demand at no improvement in their value.

WORCESTER FAIR.—There was a large supply of beef, and many fat oxen were sold by auction. Beef made about 6d. per lb. Sheep were also plentiful. Fat mutton, out of the wool, brought about 6¼d., in the wool 7¼d. to 7½d., and considerable business was done in this department. The show of store cattle was limited, and the demand was tolerably brisk, at improving figures. Store sheep were more plentiful, and sold well.

CHESTER.—There was an abundant supply of cheese for the time of year. Plenty of factors were present, and purchased freely anything that was good. Prices ranged from 45s. to 62s. The quantity pitched was nearly 130 tons. Several lots were taken home, and some remained unsold.

GLASGOW.—There was a large supply of cheese, and a very heavy market. Eight carts were shown in the bazaar, and 19 tons passed the weigh-house scales. To make sales, lower prices were taken, although we continue former quotations: Prime early made, 49s. to 52s.; inferior and late made, 44s. to 48s.; new skim, 24s. to 25s.

HOP MARKET.

BOROUGH, Monday, April 26.—Our market maintains the same steady character as of late, most descriptions being in moderate request, at the following quotations.

Mid and East Kents....	70s. to 90s.,	choice 112s.
Weald of Kent........	54s. to 60s.,	" 66s.
Sussex	50s. to 54s.,	" 60s.
Yearlings, &c.	21s. to 35s.,	" 50s.

POTATO MARKETS.

SOUTHWARK, WATERSIDE, Monday, April 26.—Since our last report the arrivals have not been heavy, either coastwise or from foreign ports, but the trade has been in so languid a state that there has been no opportunity of effecting sales; so that our quotations are almost nominal, as follows—

Yorkshire Regents............	140s. to 180s.	per ton.
Lincolnshire do...............	140s. to 160s.	,,
Dunbar do....................	140s. to 180s.	,,
Do. reds	80s. to —s.	,,
Perth, Fife, and Forfar Regents	120s. to 140s.	,,
Ditto ditto reds	70s. to 80s.	,,
French whites	40s. to 80s.	,,
Belgian do....................	50s. to 60s.	,,
Ditto reds	80s. to 90s	,,

BOROUGH AND SPITALFIELDS.

LONDON, Monday, April 26.—The supplies of home-grown Potatoes are on the increase. Since Monday last the imports from abroad have amounted to 300 tons from Antwerp, 210 tons from Rouen, 110 tons from Bruges, 126 tons from Louvain, 335 tons from Dunkirk, 110 tons from Ghent, and 30 tons from Gronengen. The trade generally is heavy, as follows:

York Regents	140s. to 180s.	per ton.
Kent and Essex do............	80s. to 160s.	,,
Scotch	120s. to 160s.	,,
Do. Cups	90s. to 100s.	,,
Middlings......................	50s. to 90s.	,,
Lincolns	120s. to 140s.	,,
Foreign	60s. to 100s.	,,

COUNTRY POTATO MARKETS.—York, April 17.—Potatoes sell at 13d. to 14d. per peck, and 4s. per bushel. Leeds, April 20.—A fair show of potatoes, which sold readily at 15½d. per 21 lbs. wholesale, and 16½d. retail. Malton, April 17.—Potatoes, 1s. per peck. Richmond, April 17.—Potatoes, 4s. 8d. per bushel. Manchester, April 22.—Potatoes, 13s. to 21s. 6d. per 252 lbs.

PERTH POTATO TRADE.—The potato trade has been dull this week, and prices have a downward tendency except for seed sorts. No dealer is willing to risk a venture in the southern markets at the former rates, owing to the heavy importations from abroad. Retail prices have not experienced any alteration.—*Perth Courier.*

ENGLISH BUTTER MARKET.

LONDON, Monday, April 26.—Our market is firm, and quotations for price are about the same.

Dorset, fine	per cwt.	116s. to 118s.
Ditto, middling...............		100s. to 106s.
Fresh............	per doz. lbs.	10s. to 15s.

CARMARTHEN, (Saturday last.)—A small quantity of new Butter has been brought into this market, the quality far below the standard; but after the fine copious rains which have fallen we shall soon have plenty of grass, and a good supply of first-class butter. Farmers realized this day for new Butter 1s., and for old Butter 10d. to 10½d. per lb. Cheese a dragging trade, from 20s. to 22s. per cwt.

BELFAST, (Thursday last.)—Butter: Shipping price, 100s. to 112s. per cwt.; firkins and crocks, 10d. to 11d. per lb. Bacon, 52s. to 56s.; Hams, prime 70s. to 76s., second quality 60s. to 66s. per cwt. Prime mess Pork, 85s. per brl.; Pork, 43s. to 49s. per 120lbs.; Beef, 120s. to 130s. per tierce; Irish Lard, in bladders, 72s. to 76s.; kegs or firkins, 64s. to 66s. per cwt.

ON THE PRACTICE OF PARING AND BURNING IN DAUPHINÉ (FRANCE.)

BY F. R. DE LA TREHONNAIS.

Before I had the pleasure of reading Dr. Voelcker's excellent paper upon the subject of paring and burning, as practised upon the Cotswolds, in Gloucestershire, published in the last number of the Royal Agricultural Society's *Journal*, I had intended to write the following remarks upon the same subject, from notes taken in September last at Grenoble, whither my duties as Vice-president of the Agricultural Section of the Scientific Congress had called me. I am glad other engagements and more pressing occupations have delayed my writing upon this interesting topic, because the perusal of Dr. Voelcker's able paper has enabled me to elucidate several points which I could not satisfactorily explain; and, in reciprocity, I feel certain that the result of experiments and observations made at so great a distance from the Cotswolds, and under such different circumstances, and, moreover, quite independent of his own, will prove interesting to that able Professor, and to those who, like myself, have derived so much pleasure and instruction from his valuable contribution to the Society's *Journal*.

On my way to Grenoble, through the magnificent and fertile plain of Graisivaudan, I had remarked upon many fields a multitude of little mounds, systematically arranged, and undergoing the process of burning; for the careful attention of the men in attendance, in raking fresh soil over those mounds evincing symptoms of entire combustion, at once led me to suppose that a slow charring, rather than incineration, was aimed at. Subsequent inquiries proved that I was right in my conjectures.

Numerous excursions in the neighbourhood, and frequent conversations with the farmers, showed me that this practice of burning was a general system throughout the country, and regarded by all as a most useful operation—equivalent, in fact, to a complete application of manure.

There is nothing for which I entertain so great a respect as those practices based upon the experience of time immemorial, and handed down from generation to generation, to our own time, although perhaps no one was ever concerned in ascertaining the why and wherefore of such practices; the well-established fact of their efficiency, borne out by the evidence of daily experience, being a sufficient ground for their continuance.

This practice was the object of much discussion at the Congress. It was pooh-poohed by several. For myself, I did not view it at first with any high degree of favour, although I was ready to admit that it must be attended with some beneficial results, or else its prevalence would not have become so constant and so general. I resolved, then, to investigate closely the nature of the operation, to ascertain the chemical character of the soil, and to determine as accurately as possible the chemical reaction and other phenomena generated by the process of combustion.

Happily for my inquiries, there were in the Congress several gentlemen residents of the country, who had bestowed upon that subject a great deal of attention; and, with their kind help, by which I was saved a great deal of time and trouble, I have succeeded in satisfactorily explaining the beneficial results of burning, in the peculiarly-constituted soil of the plain of Graisivaudan.

The practice of paring and burning is evidently one of great antiquity. In the "Théâtre d'Agriculture," written more than three hundred years ago by the celebrated Olivier de Serres, we read a very minute description of that operation as practised in his time; and the advantages he enumerates as resulting from this mode of preparing the land, especially for green crops, so fully bears out the conclusions arrived at by Dr. Voelcker and the experience of the farmers in Dauphiné, that I am induced to offer to my reader a condensed translation of Olivier de Serres' description, which no doubt will be new to the public, as the bulky work from which I take it is rather rare, and very little known,

It must be borne in mind that the following passage was written more than three centuries ago; and I wish I could render in adequate modern English the quaint and picturesque old French style of the author:

"Since tilling the land is nothing else but to pulverize and scarify it, to render it capable of receiving, nourishing, and bringing the seeds to maturity, it follows that the operation which effects this result the sooner and the better is the most praiseworthy. It is baking or burning the clod or turf which bears the honour of this husbandry above all other kinds of tillage, by means of which the land is perfectly well prepared; since, being freed from all hardness, roots, and weeds, it is rendered fine, like ashes, and afterwards fruitful in all kinds of crops. The land, being thus renovated, will produce nothing spontaneously (having no seeds left in its bosom), but will gaily grow all that which you will commit to it. Garden-crops, fruit-trees, vineyards, delight in soil thus prepared more than in any other. Meadow-lands are greatly benefited by it, and become richer than anywhere else. In conclusion, this husbandry, by its excellence, may be said to be the quintessence of agriculture, and worthy of admiration; man having found by this artifice the means of accomplishing in ten days that which it takes the sun several years to do, preparing the land in so short a time and so well, and this by fire, that it is rendered subtle and obedient to produce anything. That invention came from the burning of torn-up woods and plantations, from which the people grew abundance of corn. For a long time has this mode of cultivation been resorted to upon cold mountains, which thus derive from fire what they lack from the sun."

Then follows a minute description of the *modus operandi*, which differs very little from that used in Gloucestershire, and still less from what I have observed in the plain of Graisivaudan. Olivier de Serres recommends this operation to be made in May or commencement of June. The turfs should be first dried, then heaped up over a small faggot, the grass side downwards. This heap should be about five feet in diameter at the base, and from four to five feet in height. They should be arranged at regular intervals and in straight lines, for the better distribution of the ashes over the land. The author strongly recommends to avoid a rapid combustion, saying, "Clods and turfs must be constantly heaped up over the mounds from which smoke issues in too great a volume;" and so much importance does he seem to attach to this point, that he says the fires should be watched night and day. He further remarks that in other countries, where this practice was prevalent, and especially in Piedmont, clods of clay are mixed with the turf. He argues at some length the policy of having one or two large heaps, or else a numerous series of small ones; and although the large heaps offer some advantages, the chief of which is the economy of fuel, he prefers the smaller ones, as being more handy for spreading, and also because a greater area of surface is burnt by the multiplicity of the heaps over the land, and especially, he adds, because the earth is not baked so hard as would be the case with a large heap, where the earth in immediate contact with the fire would be overburnt, and produce no good effect. After considering all these points, the author goes on:

"As soon as the fire is extinguished, the earth will cool of its own accord in a short time, and it will remain in heap until a fall of rain is anticipated, when it should be spread evenly over all the surface, except over the spot where the heaps stood, because there the earth is sufficiently burnt and prepared; this will appear evident from the wheat, in its time, being more luxuriant in those places than elsewhere, as if in those places alone the richest manure had been applied.

"After this, the field should be ploughed, but very lightly, at most three inches deep, in order to mix by little and little the burnt with the raw soil of the bottom. The subsequent ploughings should be deeper; and if the burning has been expedited in June, and good showers have occurred, canaryseed, turnips, &c., either mixed or separate, can be sown; then in the following October rye or wheat can be sown, three or four years in succession."

Further, the author says: "Not only will such earth, burnt and thus prepared, enrich the land, but if carted to other fields, as is done with stable-dung, it will greatly amend them also. All kinds of fruit trees are rejoiced by this earth, if some of it is put around their roots; and it will also be highly beneficial to artichokes, asparagus, and other precious garden plants."

Then meeting the objection of those who think this amendment of the soil is not a lasting one, thinking all the fertilizing elements are destroyed by the action of the fire, he says: "As to the fear of short duration, those alone who have not tried it have this opinion, doubting a thing so well authenticated; for every tillage thus prepared remains strong and vigorous enough to serve as long as can be desired, provided the field be treated as to rotation of crops according to the laws of good husbandry, and not according to the ancient oracle, 'Do not draw all the nutriment from thy field.' All these things weighed and considered, our husbandman shall prefer this mode to any other, if the high price of fuel does not hinder him; and this is the only excuse he can have. And, as a conclusion, he will form his opinion of this practice from the report of those who use it the most, and who say in their *patois*:—

'Those who do not pare and burn,
When others reap, will only glean.'"*

Such were the ideas about paring and burning three hundred years ago, when a time-hallowed experience was the only guide of agriculture. Those who have had the good fortune of reading Dr. Voelcker's able paper upon this subject will not fail to be struck with the great analogy existing between his statements and those of Olivier de Serres; the only difference, a very striking one, showing the immense stride accomplished by science during this long interval, is, that Olivier de Serres gives no other reason for recommending the practice than the experience of ages, corroborated by his own; whilst to this cogent one, Professor Voelcker adds the forcible arguments of scientific analysis and demonstration.

I will now submit to the reader the result of my investigation in Dauphiné, where, as I have stated, the practice of paring and burning exists as a regular and well-established mode of manuring the land at a small cost.

The beautiful plain of Graisivaudan, so well known for its picturesque magnificence and its extraordinary fertility, forms the basin of the river Isère, from the frontiers of Savoie, to the city of Grenoble. Below Grenoble, following the course of the river, it takes the name of Moirans, up to the Rhone, in which the Isère falls. On one side of the valley is the chain of the Alps; on the other, the group of the Chartreuse mountains. Its soil consists of alluvial deposits from the disintegration of the calcareous rocks of the neighbouring mountains brought down by the river Isère, subject to frequent overflowings, and by the torrents from both sides of the mountain boundaries, which from every ravine pour into the valley, along with their turgid waters, streams of calcareous gravel, loosened from the limestone cliffs by the action of the atmosphere, and then borne along by the torrents. Such soil like that described by Dr. Voelcker in the neighbourhood of Cirencester is then eminently calcareous, the proportion of carbonate of lime being generally from 30 to 40 per cent., and sometimes amounts to 50 and 55 per cent. To this is not confined the remarkable analogy existing between these soils, both so greatly benefited by the same operation: the proportion of insoluble silicates is nearly the same in both; and this is an important feature, as I will presently explain.

The mode of paring and burning in the Graisivaudan Valley is identically the same as that described by Olivier de Serres: the turf is pared, dried, and then formed into small heaps over a faggot. The number of these heaps would amount to about 350 per English acre. As it is recommended by Olivier de Serres, the great point of the operation is to produce carbonisation, and not incineration, of the superincumbent vegetable and earthy matters. But however carefully the ovens are watched, there is always a certain degree of incineration, in the centre of the heap, of those parts which are in close proximity to the fire: the earthy matter becomes bricky, and of a reddish colour. This, in the experience of the most skilful burners, is to be avoided.

M. Emile Gueymard, a government chief engineer, who has paid great attention to this subject, points also to the overburning of the earthy and vegetable matter as an evil by all means to be avoided. This eminent chemist very truly says that the turf and the clods contain humus, and other matters, which, during the burning process, yield some carbonate of ammonia. It is, then, very evident that, if the temperature be too high, all the humus disappears, and the carbonate of ammonia—a most valuable fertilising element—is volatised and totally escapes.

Besides the mechanical advantages of paring and burning, which everyone will admit, for strong retentive soils, and these others so ably demonstrated by Dr. Voelcker as resulting from that practice upon the poor clay lands of the Cotswolds, there is another upon which M. Gueymard lays a great stress, that is the transformation of insoluble silicates into gelatinous or soluble silicate immediately available to the plants. The stems of most herbaceous plants contain from 30 to 50 per cent. of silica, giving them that rigidity which enables them to withstan the blast of high winds. Silica is very abundant in most soils, since they contain a large proportion of earthy silicates. But silica in such a combination is not soluble, and cannot be assimilated by the plants; for that purpose it must become *gelatinous*. This is effected by the contact with carbonic acid of the air and the humidity of the soil, but by so slow a process, that it often happens the plant cannot find a sufficient quantity for the requirements of its growth.

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* Qui non crème, ou non fème,
Quan tous autres meissonnou, il glèse.

Earthy silicates, however, when acted upon at a high temperature by alkaline or earthy carbonates, become soluble in acids, and are then available to the plant. Now, all the soils which are found from experience to benefit by paring and burning contain silicates and carbonate of lime; and thus an element of nutrition supplying the plant with what may be compared to the bones of animals, that is, the siliceous coating of their stems and leaves, which enable them to stand erect and rigid, is rendered immediately available. But a certain temperature is necessary to produce gelatinous silica. M. Gueymard says that in all his analyses he found this substance only in the layers of clods and turf which were in immediate contact with the fire, that is, in the very nucleus of the mound; the outward layers, which were only charred, did not contain any. This observation is borne out by the fact, that on the spot where the fire stood the stems of the wheat or hemp plants, which are generally cultivated after burning, are invariably found to be stronger and tougher than anywhere else.

Another chemist, M. Lebreton, goes a step further, and pretends that combustion introduces into the soil a certain quantity of ammoniacal salts, the formation of which cannot be attributed to the remnant of manures and organic matter left in the soil.

I will now examine how the presence of these ammoniacal salts, which I have been able to ascertain do really exist in burnt soil, and in the distilled water with which some of it had been washed, can be chemically accounted for; begging the reader to consider this explanation as a mere surmise, as I am not aware that actual experiments have been made to test its accuracy.

It is well known that some porous substances have the remarkable property of producing the combination of certain bodies by the simple means of the intimate contact produced by the simultaneous passage of these bodies through the pores of that substance. It is thus that alkaline cyanures are now prepared without the help of animal matter, and by *fixing the nitrogen of the air*. The process consists in *passing through a porous substance impregnated with an alkaline solution a mixture of steam, air, and oxide of carbon; this last gas being obtained by the incomplete combustion of charcoal in a furnace suitably heated*.

Now, in the burning of land, the circumstances are precisely the same as in the above process, viz., an incomplete combustion, the gaseous products of which are mixed with air and watery vapour; and the passage of this mixture through a porous mass containing several energetic bases, such as lime, potash, magnesia, and cyanures may then be produced, which, by being subsequently decomposed, must give ammoniacal results.

But this is not all; besides the oxide of carbon, the gaseous mixture contains a great quantity of carbonized hydrogen, since part of the burning process consists in the *distillation of wood*, as well as an incomplete combustion of charcoal. Now, carbonised hydrogen mixed with air, and passing through the porous mass, becomes decomposed; its hydrogen forms ammonia by combining with the nitrogen of the air, and its carbon forms carbonic acid by combining with the oxygen: hence the carbonate of ammonia always found in burnt earth.

With whatever cavils chemists may attack this explanation, it is nevertheless beyond controversy that in the burnt mounds of the fields, in Dauphiné, I have recognised the presence of ammoniacal salts, the existence of which can but in a very small degree be accounted for, from the existence of organic matter in the soil previous to its being burnt: the only source from which it can be produced is undoubtedly the nitrogen of the atmosphere.

Norwood, March 3.

SUPERIOR LINCOLNSHIRE RAMS TO BE FOUND IN LEICESTERSHIRE.

SIR,—For many years the ram breeders in Leicestershire have gone into the county of Lincoln to hire or purchase rams; and at Peterborough fair you may not only find many ram breeders from the county of Leicester, but from many other near and far distant counties, with a view to make a new breed more profitable, by producing more weight of wool and mutton per acre; as actual merit is profit. Men of weak understanding are caught by mania, ornament, and fashion, not considering what an animal makes, so much as what it costs making. It, of course, is bad, to breed animals without profit: an ornamental animal is one thing, and a profitable one is another. We have no business to breed any inferior cattle, sheep, and horses, but the best of its kind, as the best consume no more food than the worst. In trying to breed animals with too great a proportion of fat flesh in proportion to the lean, not only are the stamina and size, but the milk is deteriorated; which caused the once Bakewell *alias* long-horned cattle to degenerate in size, lean flesh, bone, and milk; being now nearly shadows to what they were in Mr. Bakewell's day. Animals may be bred until they nearly lose all their milk, which spoils them for the country dairy-men and the great milk-men in the metropolis; and many of the Bakewell of Leicester sheep have been bred until they have reduced their size, constitution, milk, and lean flesh. Mr. Bryan Ward, at Drayton, on the Welland, Leicestershire, many years back, crossed his pure-bred Leicesters with the best Lincolns he could find, which increased the wool, size, constitution, and lean flesh. Mr. Ward lets yearly upwards of 100 ram sheep, which have improved numerous flocks in many counties. Mr. Sandy, of Holme Pierrepoint, has proved, by the great number of prizes he has taken at the Royal Shows, that he has the best pure-bred Leicesters in the kingdom. SAML. ARNSBY.

Mill Field, Peterborough, April 10, 1858.

MY WINTER GARDEN.—The March breeze is chilly, but I can be always warm if I like, in my winter garden. I turn my horse's head to the red wall of fir stems, and leap over the furze-grown bank into my cathedral, wherein, if there be no saints, there are likewise no priestcraft and no idols; but endless vistas of smooth, red, green-veined shafts holding up the warm, dark roof, lessening away into endless gloom, paved with rich brown fir-needle—a carpet at which nature has been at work for forty years. Red shafts, green roof, and here and there a pane of blue sky—neither Owen Jones nor Willement can improve upon that ecclesiastical ornamentation; while for incense I have the fresh healthy turpentine fragrance, far sweeter to my nostrils than the stifling narcotic odour which fills a Roman-catholic-cathedral. There is not a breath of air within, but the breeze sighs over the roof above in a soft whisper. I shut my eyes, and listen. Surely that is the murmur of the summer sea upon the summer sands in Devon, far away. I hear the innumerable wavelets spend themselves gently upon the shore, and die away to rise again. And with the innumerable wave-sighs come innumerable memories, and faces which I shall never see again upon this earth. I will not tell even you of that, old friend. It has two notes, two keys rather, that Æolian harp of fir-needles above my head; according as the wind is, east or west, the needles dry or wet. This easterly key of to-day is shriller, more cheerful, warmer in sound, though the day itself be colder; but grander still, as well as softer, is the grand soughing key in which the south-west wind roars on, rain-laden, over the forest, and calls me forth—being a minute philosopher—to catch trout in the nearest chalk-stream.—*Charles Kingsley in Frazer's Mag.*

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

Although the weather has been somewhat favourable for the time of year, the frequent changes in it have had the effect of checking the progress of vegetation; nevertheless, our accounts from most of the leading agricultural districts, in reference to the general appearence of the young wheats, are very favourable. Everywhere they are looking strong and healthy, and promise a good return to the farmer. The sowing of Lent corn was concluded about the usual period, and as respects the plants no reasonable complaints can be made.

The all-engrossing topic of discussion in agricultural circles has naturally been the almost continuous decline in the value of wheat. Some persons contend that that produce has run down to a point at which speculation is sure to commence, whilst others are of opinion that prices have not seen their lowest range. The position of the trade, we may remark, is very different from what it was at this time last year. Then, the French ports were closed against exports, and our millers were not subject to direct competition in an article fully equal in quality to their own. This competition has induced great caution in buying wheat where otherwise it would not have existed; not that our importations have been large, but the almost entire absence of orders from this country has compelled the French millers and the usual shipping houses to forward to agents in this country, and the orders have for the most part been to sell immediately on arrival. So long as this system continues—and it is not confined to flour only, as similar advices have been received with most of the wheat imported from Germany and the Lower Baltic ports—so long shall we have to report dull and, perhaps, drooping markets, even though the stocks of foreign produce in warehouse have become much reduced. We must bear in mind that very large quantities of wheat remain in the hands of the farmers both in England and throughout the continent, as well as in the United States. An extensive speculation, and a determination to warehouse rather than sell at present prices, might improve the trade to some extent; yet, on the other hand, we are fully aware that any upward movement in value in this country would be followed by a large outflow from America, where the shipping season is just commencing. As yet, very little of last year's wheat has been exported, and the shipments of flour have been only moderate—those of other articles having fallen off considerably, as will be seen by the annexed official return made up to the 13th of April, current year:—

EXPORTS OF BREADSTUFFS FROM THE UNITED STATES TO GREAT BRITAIN AND IRELAND SINCE SEPT. 1, 1857.

	Flour. brls.	Meal. brls.	Wheat. bush.	Corn. bush.
1857-58	744,339	123	3,415,596	2,351,437
1856-57	775,188	186	7,011,580	4,102,980
1855-56	735,988	5,719	3,755,317	4,337,877
1854-55	130,704	5,235	206,545	4,649,478

TO THE CONTINENT.

	Flour. brls.	Wheat. bush.	Corn. bush.	Rye. bush.
1857-58	182,143	209,751	14,901	—
1856-57	379,388	2,716,791	496,913	216,162
1855-56	619,964	2,156,734	214,287	1,426,210
1854-55	7,646	—	295,645	35,541

From the above figures it must be obvious that a large quantity of produce is still in stock in the United States, unless, indeed, the extent of last year's crop has been greatly over-estimated. Apparently, therefore, there is no prospect of any important movement in the value of wheat for some time.

As regards spring corn we may write differently. Our own crops are wholly inadequate to meet the demand; consequently, we shall no doubt use up every quarter of barley, oats, beans, and peas imported during the season, without producing any important change in the quotations. Compared with wheat, spring corn is commanding good prices. Many of our large growers, rather than sell at present quotations, have determined to hold over their wheats till next year. Possibly this is sound policy, as we can scarcely anticipate two consecutive years of such enormous *general* abundance as last season produced, and we do not see any reason to look forward to other than a steady increase in the consumption of the better kinds of food, as the trade and commerce of the country are unquestionably steadily recovering from the effects of the late severe panic.

We have continued to import very large quantities of potatoes from the continent. In some measure, they have made good the deficiency in our own crop and rendered the trade somewhat heavy; nevertheless, good and fine samples have sold at from 160s. to 180s. per ton. The quantity of sound potatoes now on hand in this country is reduced to a narrow compass; but on the continent, especially in France and Belgium, the supply is large for the time of year.

Throughout the month the wool trade has been in a most depressed state, and prices of all kinds of wool have given way nearly, or quite, 1d. per lb. The public sales are likely to go off heavily at further depressed rates, since nearly or quite 60,000 bales will be offered during their progress.

Store stock, arising from the heaviness in the demand for fat beasts and sheep, has ruled heavy and drooping. The business done has been very trifling.

Throughout Ireland and Scotland there has been no important movement in the corn trade Wheat has continued dull and flour has ruled lower, but other articles have mostly supported former terms. From Scotland steady shipments of produce have been made to the south, but the exports from Ireland have shown a great deficiency when compared with many former corresponding seasons.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that the trade of the country is recovering from the effects of the late panic, that consumption is rather on the increase, and that the importations from the continent still continue limited—compared with many previous corresponding periods of the year—the cattle trade has been in a very unsatisfactory state during the whole of the month, and a severe fall has taken place in the quotations, Whatever may have been urged to the contrary in some quarters, it is now clearly apparent that production has over taken consumption. And who, we may ask, can feel surprised at this result, which reflects the highest credit upon our breeders and feeders? and, further, may we not rest satisfied that even low prices will not have the effect of lessening the producing powers of the United Kingdom? The present value of beasts in our markets—the general top quotation being only 4s. per 8lbs.—may induce greater moderation on the part of the breeders as to price; certainly, the graziers have lost very large sums of money on nearly every head of stock sold during the last three or four weeks. At one period, store animals were selling considerably above their value; but the prosperous state of commerce, and the enormous consumption, induced graziers to add largely to their supplies, and the consequence is that a serious loss has been sustained. In all dealings, it should be borne in mind that there is a limit to consumption, consequently to price—the latter, of course, being regulated by the former; hence, to speculate in stock beyond what may be considered a fair sum—we here refer to the usual transactions only—is a matter which frequently leads to disappointment and loss. Had it not been that France has imported largely for some considerable time—indeed, even now, both beasts and sheep are drawn from Spain and Holland for immediate consumption—we should have had a much larger influx of stock from the continent, and, perhaps, even a greater fall in the quotations. As it is, however, the importations have been reduced to almost a nominal amount. But when we consider that the production of live stock in France is increasing under what may be termed good auspices, and that great exertions are being made to improve the weight and quality of the various breeds, by means of importations from this country, it is by no means improbable but that, in the course of a very few years, France will be wholly independent of any other country for the supply of food: hence, the surplus produce of Holland will again flow in upon us, and prices may suffer in the general run of years. We must not affect to despise the production of live stock in Holland, because in that country a marked change has taken place in the production, especially of sheep. On the passing of the tariff, the arrivals of sheep from that country were, with the exception of their carrying a full average quantity of internal fat, of an inferior class, and only suited for consumption in very poor localities. Now, however, the case is different. The legs of the animals have been shortened by extensive crossings with English breeds, the tails have been well cropped, and not a few of them have sold as high as 65s. each. Thus, whenever France produces an adequate amount of meat for home consumption—we will not say that eventually she will be able to export much, though exportations may be looked for,—our breeders and feeders must be prepared for additional weight in every head of stock imported from the continent, and which, as a matter of course, must have considerable influence upon value. For some years we imported enormous *numbers* of both beasts and sheep; but they failed, owing to their light weighing qualities, to have any depressing influence in our markets: still, it is an open question, and one of no ordinary importance, whether we shall have a return to what may be termed high periods for either beasts or sheep.

We have already remarked that live stock has considerably declined in value, and the fall will be better understood, when we state that the best Scots have scarcely produced more than 4s. 2d., against 5s. in the corresponding month in 1857, and that the difference in the price of the best Downs in the wool has been nearly 1s. 4d. per 8 lbs. Lambs, calves, and pigs have fallen to nearly the same extent, and the increase in the supplies of the latter in nearly every county in England, including Ireland, is very remarkable. It will, however, be recollected that in April, last year, there was considerable excitement in the trade, arising from the publication of an order in council, prohibiting the importation of stock from some parts of Germany, owing to the discovery of an extensive murrain, which happily did not extend itself; nevertheless, other months might be selected to prove that production has increased, and the mania for buying at almost any price has subsided into what may be termed a more reasonable state of things.

Very few complaints have reached us from any quarter in reference to the health of the stock. Everywhere, about an average supply of food is on hand; but the graziers complain of the shortness of grass in the pastures, and of the continuous changes in the atmosphere having had the effect of retarding the progress of the grass-crop. The lambing season has progressed remarkably well. There has been a strong and healthy fall, and the number of twins is generally remarked upon by our correspondents.

The following return shows the imports of foreign stock into London during the month:—

Beasts	1,063	head.
Sheep	4,082	„
Calves	830	„
Pigs	23	„
Total	5,998	„
Same time in 1857	4,814	„
„ 1856	1,924	„
„ 1855	4,253	„
„ 1854	4,760	„
„ 1853	14,787	„
„ 1852	5,444	„

The total supplies shown in the Great Metropolitan Market have been as under:—

Beasts	17,950	head.
Cows	400	„
Sheep and lambs	104,380	„
Calves	1,332	„
Pigs	2,097	„

In April, 1857, there were exhibited 18,601 beasts, 460 cows, 92,810 sheep and lambs, 1,240 calves, and 2,025 pigs; hence, the principal difference in the supplies during the past month is an increase of about 12,000 head of sheep.

From Norfolk, Suffolk, Essex, and Cambridgeshire 11,700 Scots and shorthorns have come to hand. The receipts from other parts of England have amounted to 2,260 of various breeds; from Scotland, 920 Scots; and from Ireland, 910 oxen, &c. This is a large number to be drawn from Ireland in one month; but, no doubt, had the manufacturing districts been more active, a portion of the supply would have been sent to Manchester.

Beef has sold at from 2s. 10d. to 4s. 2d.; mutton, 3s. to 5s.; lamb, 6s. to 7s.; veal, 4s. to 5s. 4d.; and pork, 3s. to 4s. 4d. per 8 lbs. to sink the offal.

COMPARISON OF PRICES.

	April, 1855.						April, 1856.						April, 1857.				
	s.	d.		s.	d.		s.	d.		s.	d.		s.	d.		s.	d.
Beef, from	3	2	to	5	0	..	3	2	to	4	10	..	3	4	to	5	0
Mutton..	3	2	—	5	0	..	3	6	—	5	8	..	4	6	—	6	2
Lamb....	5	4	—	7	0	..	6	0	—	7	4	..	5	10	—	7	4
Veal	3	8	—	5	0	..	4	0	—	5	8	..	3	8	—	5	10
Pork	3	4	—	4	4	..	3	6	—	4	8	..	3	8	—	5	0

For the time of year, Newgate and Leadenhall have been very extensively supplied with both town and country-killed meat. The general demand has ruled heavy at drooping prices. Beef, from 2s. 8d. to 3s. 8d.; mutton, 3s. to 4s. 2d.; lamb, 5s. to 6s. 4d.; veal, 4s. to 5s.; pork, 2s. 10d. to 4s. 2d. per 8lbs., by the carcase.

EAST SUFFOLK.

The months of January and February were not so winterly as former years, yet attended with light frosts, and scarcely any downfall, which brought the land into beautiful tillage, and some quantity of spring corn was sown. March set in with piercing north-east winds, severe frost, and heavy fall of drifting snow, which stayed the progress of sowing; this continued till the middle of the month, from which time, although the weather has been variable, it has been highly beneficial to spring sowing, and we can scarcely record when the seed has been put in more advantageously for a crop. Three weeks since, wheat, from the weather in March, was looking rusty, and on some light lands, where the snow was drifted off, the blade was hardly visible, and fears arose as to its recovery; the late, and present fine weather has quite established it in colour, and indicates up to this time the appearance of an abundant crop, and we consider it as forward as on average seasons. The prices of barley, beans, and peas have been on a par with wheat. There is a great portion of last year's large crop in the growers' hands, many of whom have concluded, rather than sell 63lbs. per bush. reds at 42s. per qr., to hold over on rick. Barley is quite out, and maltsters leaving off steeping. Beans and peas—a rarity to see a sample with us. Grazing has been very unprofitable this season, and we know of fat bullocks having been selling at lean prices. —April 22.

SOMERSETSHIRE.

We are now favoured with as fine clear sky as is ever witnessed in this month, which has told accordingly upon the growing crops of wheat, the forwardness and luxuriant appearance of which have not been exceeded for several years. It is generally acknowledged that our prospects depend on a continuance of dry weather, and no heavy rains for an extra fine crop, but that even the usual fall of rain will have a contrary effect, more especially as regards the quality. Should the forcing heat of the present month be followed by anything like it in the next, we shall have an early kerning. The land is certainly better prepared for dry forcing heat than for many preceding years; yet if it continue, it will tell on the late-sown crops, barley and beans especially. Winter beans are just coming into bloom, and are very promising. The early-sown spring beans are nicely up: on shallow soils a dry month will try them greatly, and must lessen their produce. The early-sown barley and oats are very forward. Vetches and the artificial green crops have grown very fast since the rain, and we have more water in our brooks and pools than at any time during the winter, which will prove of great service. Our meadows are just ready for turning out, and their favourable appearance has tempted buyers to give much higher prices than last year, for poor sheep one-year-off. Devons have fetched as high as 52s. to 54s., couples 50s. to 60s.—prices by no means justified by the probable value of mutton or wool. Poor stock has come down, but not by any means in proportion to fat stock, which are a complete drug, and must entail loss upon the dealers. We have promise of fair blossom on the fruit-trees; the apple-trees being expected to display their floral adornments within a fortnight. Potatoes, which had been cut down by early frosts, have, within the last few days, again sprung up above ground, and, if there be no more frost, will go on rapidly. Some little business was done last week in wheat at the advance, which has since been more than lost. Most of the wheat in the farmers' hands can be kept back; and where it is held in large quantities this will be accomplished with but slight risk at present unusually low prices; so that it is probable we shall have short supplies before next harvest: and if foreign supplies also fall off, there is every probability of wheat being able to more than maintain its present value. The late fall in Mark Lane has been more firmly withstood in our market than any previous depreciation. White wheat, weighing 64lbs. per bushel, is quoted at 5s. 9d., 62lbs. at 5s. 6d.; red, 60 to 61lbs. 5s., 62lbs. 5s. 3d., 64lbs. 5s. 4½d. to 5s. 6d. Beans are in demand, at 4s. 9d. to 5s. 3d Oats are scarce, and sell readily at 2s. 9d. to 3s. 3d. Barley does not lie on hand, and realises improved prices. Flour fetches 31s. to 32s. per 280lbs. Mutton in the wool is sold for 6½d. to 7d. per lb.; beef 9s. 6d. to 10s. 6d. per score, but very little this week worth the latter price. Green bacon 6d. to 6½d. per lb.; pigs 9s. per 20lbs. Little doing now in cheese, the prices lately having been more stationary, the best worth 60s. per cwt. upwards. No quotable price for wool, transactions being unreported.—4th Month 28.

MONTHLY RETURN.

An Account shewing the Quantities of Corn Grain, Meal, and Flour, imported into the United Kingdom, and admitted to Home Consumption, in the month of March, 1858.

Species of Corn, Grain, Meal, and Flour.	Imported from foreign Countries.		Imported from British Possessions out of Europe		Total.	
	qrs.	bush.	qrs.	bush.	qrs.	bush.
Wheat	200741	7	880	4	201622	3
Barley	65003	6	..		65003	6
Oats	22687	3	..		22687	3
yo	4887	2	..		4887	2
Peas	2757	5	12	3	2770	0
Beans	23635	7	..		23635	7
Maize or Indian Corn	100831	1	..		100831	1
Buck Wheat	10	3	..		10	3
Beer or Bigg	..		..		..	
Total of Corn and Grain	420556	2	892	7	421448	1

	cwts.	qr.	lb.	cwts.	qr.	lb.	cwts.	qr.	lb.
Wheat Meal and Flour	528298	2	21	1292	0	21	529590	3	14
Barley Meal	..			..			..		
Oat Meal	439	0	23	..			439	0	23
Rye Meal	153	0	0	..			153	0	0
Pea Meal	0	2	0	..			0	2	0
Indian Meal	172	1	26	..			172	1	26
Buck Wheat Meal	1	1	10	1	3	0	3	0	10
Total of Meal and Flour.	529065	0	24	1293	3	21	530359	0	17

QUANTITIES OF CORN IMPORTED

INTO LONDON, LIVERPOOL, HULL, NEWCASTLE, BRISTOL, GLOUCESTER, PLYMOUTH, LEITH, GLASGOW, DUNDEE, AND PERTH, IN THE WEEK ENDED APRIL 14.

Corn, Flour, and Meal.	Quantities Imported.				Amount of Duty.					
	Foreign.		Colonial.		Foreign.			Colonial.		
	Qrs.	Bush.	Qrs.	Bush.	£	s.	d.	£	s.	d.
Wheat	67246	0	0	5	2496	7	11	0	0	9
Barley	19920	3	..		996	1	0	..		
Oats	23778	7	..		1181	0	4	..		
Rye	1207	6	..		60	7	11	..		
Peas	1268	3	5	0	63	3	5	0	5	0
Beans	5458	5	..		272	18	9	..		
Indian Corn	9081	6	..		454	8	6	..		
Buck Wheat	37	5	..		2	1	4	..		
Bere	..		..		..			..		
	127994	3	5	5	6525	9	9	0	5	9

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

Like the previous months of this extraordinary year, April has been without the usual characteristics (shower and sunshine), dry weather having far preponderated, with, however, a good deal of cold in the early part of the month, so that the progress of vegetation, on the whole, has not been rapid. This, however, is more in favour of a crop of wheat, as the blooming time is more likely to be out of the reach of rough weather. The young plants continue to look well and promising, and the seed-time for Lent corn has been most favourable; but more rain would be serviceable, especially to the grass, which is backward and short.

The wheat crop in Europe is generally well reported, especially in the South of France, Spain, and Italy; but on the coast of Africa and in the French colonies drought is doing harm to spring corn, and there were some fears for wheat. The anticipations that other Italian States would follow the example of Rome, in a permission to export, have been only partly realized. Naples, at last, has come out with an act of grace in favour of growers there; the export of wheat being permitted on payment of one silver ducat per cantar, equal to about 8s. 6d. per qr., and only reaching to the 15th June, which is nearly tantamount to a prohibition, though a few choice parcels for a limited use may come on to France and Britain. We now, therefore, pretty well know the worst of it; and this news coming with fine weather, has not prevented a rise in the market here of 1s. per qr., which is about the balance of the month's gain, after several fluctuations.

The idea of last year's fine crop has been bandied about as though it could be grown and shipped for nothing, and the contents of every foreign stack-yard was on board ship, and the labouring fleets all bound for Britain. But if England has lost heart, and her imperial ally has caught the infection, it is not so with Germany, the United States, or Russia. They, at least, think they ought to be paid for their work and produce, and very good pay may be yet in store, should any accident occur between now and harvest, which is yet fully four months distant; and the short stocks in London, after this year of plenty and continued imports, show a consumption going on unprecedented.

Dating the new era for farmers from the last Bill, it appears the last average price is 12s. 8d. below the average of the eleven years preceding; and as there is no inducement to increase the rate of shipments in the present state of prices here, it seems fair to look forward to receiving only about 1,200,000 qrs. more foreign wheat as the total arrivals before the maturity of our own crop, which is below one month's consumption; and should we advance, our friends abroad, with telegraphic means of information, instead of forcing off their stocks, will be more likely to hold for better prices. As it is, the surplus at disposal is only out of last year's produce, as the stock of old on hand everywhere was much below an average amount. The falling off in the weekly deliveries indicates a general resistance of any further depreciation; and, if still more straitened, they would soon settle the question, for the abundance of money waiting for speculative opportunities would be then partly directed to the corn trade.

In the Baltic less than an average quantity of wheat is likely to be shipped. At Danzig, the top quotation was about 45s.; at Stettin, 41s. 6d.; Hambro' quotations for red 62lbs. Holstein were 44s. 6d., 61lbs. white 45s., extra red Marks and Saale 45s. 6d. In Rotterdam, white Zealand was worth 45s.; the best heavy red Rhine bringing 46s. to 47s. per qr. Antwerp advices note 43s. as the value of Louvain red. Paris quotes about 39s. as the highest price. Nantes, 40s. for red, and 43s. the best white; first quality flour being held at 31s. 6d. (only worth 34s., duty and expenses paid, in London). Madrid quotes 53s. to 60s., and Alicante 52s. 6d. for Taganrog. The rates at Odessa were 38s. to 44s.; at Taganrog and Berdianski, 37s. to 41s. Prices at Galatz, freight included, were 38s. per qr. New York was high, the best southern red being about 42s., and best white 50s. Some reports made the stocks in the several Lake Ports reach to 700,000 qrs.; but this seems an exaggeration, and there were few symptoms of giving way.

The first Monday commenced on moderate supplies, both English and foreign, with a very slender contribution from Kent and Essex, as the morning's addition; this being in fine condition, millers took it off slowly at 1s. per qr. advance, and their attention was also more turned to fine foreign at full prices. The country markets mostly exceeded this improvement—Manchester, Leeds, Birmingham, and Bristol agreed with it; Hull, Newark, Boston, and most of the Saturday's reports made the rise 1s. to 2s.; Woodbridge and Leicester holding for 3s. more. The rise at Liverpool, on Tuesday, was 1d. to 2d. per 70lbs., and Irish customers, on Friday, produced another rise of 1d. per 70lbs., and London closed with a better appearance.

The second Monday was altogether less plentifully supplied, excepting the morning's supplies from Kent and Essex, and another 1s. was then gained, though paid grudgingly, foreign participating in the improvement. Hull, Leeds, Boston, Spalding, and Portsmouth exactly tallied with the London report; Wolverhampton, Manchester, Newark, and Gloucester made no change; Birmingham was in favour of buyers. Newcastle, Leeds, and Bristol, influenced by a favourable change of weather, were 1s. per qr. lower; and though Liverpool was 2d. per 70lbs. higher on Tuesday, this advance was barely maintained at the final market, a sudden summer-like temperature having subdued the upward tone in London.

The third Monday had less foreign wheat than the two former, with only a moderate quantity of home-growth, and few samples during the morning from Kent and Essex. With the forcing weather came a general change of feeling, which being indicated by the state of the last country markets, a reduction of fully 2s. per qr. was necessary to clear off the small show, which was not effected till about the close of the market, some accepting even still lower terms. Very few country markets fully responded to this feeling, but among them were Sheffield and Spalding. Birmingham found a ready sale at only 1s. per qr. less money. Manchester, Leeds, and Bristol were nearly as much lower as London, but at the week's end advices were less desponding, and the final reports were little altered from the previous week. London, too, on Friday, had a firmer tone. Liverpool was lower at both markets, 2d. per 70lbs. reduction being noted on Tuesday, with 1d. to 2d. per 70lbs. further on the last report.

The fourth Monday was better supplied, with the weather fine; but as the arrivals from Kent and Essex were small, there was some reaction, and fully 1s. per qr. recovered of the previous decline.

The general averages being fully a fortnight behind the business done, do not immediately show the progress of markets; but it is remarkable that the lowest average, of the 19th of April (43s. 1d.), had the sales reported as only 72,171 qrs., and the last (43s. 2d.) was only 76,791 qrs., making the fortnight's deliveries 29,572 qrs. less than during the same period last year, and this reduction in the deliveries has immediately been followed by a better tone.

The month's supplies into the port of London have been 17,414 qrs. English, and 23,834 qrs. foreign; making the weekly average 10,312 qrs., against 15,259 qrs. weekly in April, 1857. The total imports in March into the United Kingdom were 201,622 qrs. wheat, and 529,590 cwts. flour.

The flour trade, after undergoing some fluctuations, is left little altered. Town qualities have kept to the price at which they commenced, viz., 40s. per sack; Norfolks, beginning at 29s. and reaching 31s., fell back again to 29s. to 30s.; American and French remaining unaltered. The latter, though there has been a steady moderate influx, has lost money; the four marks being only worth 34s. per sack here, on 29s. the value at Paris, is fully 1s. per sack against imports; and at Nantes, the rates being 31s. 6d., leaves only 3s. 6d. per sack for duty, shipment, land-carriage, and commission. The imports into London during the four weeks were 65,080 sacks country flour, 7,269 sacks foreign (mostly French), and only 504 brls. from the United States; leaving the weekly supply about 2,400 sks. 5,200 brls. below March, but about equal to April last year.

The barley trade has scarcely varied throughout the month, excepting small occasional purchases, the malting trade being over, and therefore the best parcels have become neglected, and in future must be used for distillation. Large arrivals have during the last three weeks come from the Mediterranean, but the low rates making these sorts much cheaper than oats, they go off for mixing, and the better sorts for grinding, while but small quantities fit for the distiller come to market, the purchases being made direct. Stocks now seem working close every where, both in foreign ports, London, and the country, and, as we have before hinted, all that can come will be wanted, and a purchase of 5,000 qrs. at Odessa for June delivery at 21s. cost and freight confirms the opinion. The deficiency of fine sorts in our own crop has lately led to the use of the best French both for seed and malting, and though thin it has vegetated kindly and answered well, at Nantes the price for such is 26s. per qr. free on board. The imports for four weeks have been only 7,681 qrs. English into London, but of foreign 56,085 qrs., giving a weekly average of 15,941 qrs., which is below April 1857 by 11,824 qrs., though 6,710 over last March. The malt trade has been steady throughout the month, with little or no alteration in the value of first qualities.

The great deficiency, in the supply of oats has raised their value during the month fully 1s. 6d. per qr., and the probability is that until the Russian arrivals begin to appear, the market will be tight. As Ireland is known to have grown less than last year, and our own crop was below an average, foreign ports have all been stirred up by an inquiry which has reached to New York. At Hambro' they are quoted 25s. to 27s. per qr., with offers of 40½lbs. Swedish at the outports at 23s. 6d. At Rotterdam Zealand feed are quoted 25s; at Nantes 26s. 6d. as well as at Bordeaux. The rise referred to took place on the first two Mondays, say about 9d. on each day; this was checked on the third Monday by better supplies, though not above an average, and more confirmed on the last week, when they again fell off. The imports into London during the four weeks were 2,050 qrs. English; 4,447 qrs. Scotch; 8,499 qrs. Irish; and 44,082 qrs. foreign: making the weekly average 14,769, which is more than 5,000 qrs. below the weekly consumption; so that if it had not been for granary stores, rates must have greatly increased, but these are fast consuming. In April, 1857, the average supplies were 39,121.

Beans and peas throughout the month have rather improved in value. The first Monday brought a rise of 1s. on the former, which has been supported. Boiling peas, after much neglect by a great deficiency as respects supplies, have sold, though slowly, at fully as much money; and those for hog feed, notwithstanding their high price, being very scarce, have continued to be placed in retail, notwithstanding the general use of cheaper substitutes. The consumption of beans will lessen with the advance of the season; but as Egyptian shipments are less free than expected, there does not seem much probability of lower rates. The imports of beans during the four weeks into London were in English qualities 3,158 qrs., in foreign 8,012 qrs., making an average weekly supply of 2,792 qrs., which is nearly 1,000 over February and March, and is more than double the supply in April, 1857. Of peas there have been in the same time only 553 qrs. English, and 374 qrs. foreign, the month's supply not equalling a week of former times; but boilers have been little used, and substitutes have been found for pig food in abundance, wheat itself being cheaper than duns and maples.

The supplies of linseed running short in London, and exports being fair, prices have improved fully 1s. in the course of the month, notwithstanding the heaviness of stock. In foreign ports, too, the prices remain dear, Odessa quoting up to 55s. So that till a new and good crop is gathered the range of prices seems likely to be high. The more liberal use of cake has greatly contributed to this, its nutritive properties to the animals fed, as well as the quality of the manure they yield, making a larger demand.

The consumption of the potato crop, notwithstanding the free imports, and the high rates of the small remainder fit for use, have stimulated the enquiry for maize for Ireland, where it has been rising, and become quite a necessary, and it is probable that its comparative dearness may take off the lower qualities of wheat, which are relatively cheaper.

The seed trade has been very disappointing to importers and the trade generally, prices having given way from their height 20 to 25 per cwt., and much foreign as well as English remaining on hand, the rates paid have become irregular, some few parcels still going off for seed this season; but the reduction in value has brought speculation into the trade, and those determined to get out at any cost may now find buyers, both of red seed and trefoil, at low rates, say 40s. to 42s. per cwt., for fair foreign red Seed. Canary has unexpectedly remained dear, 96s. being quoted even at Rotterdam, whence it was thought much would come. Mustardseed, too, after long neglect, has got up in white qualities, but brown remain out of favour. Hempseed has kept its value; and the reports of the failure of the crop of tares in the Baltic have turned out true, and the few parcels appearing have obtained extravagant prices. Rapeseed was reported a partial failure and therefore rising, but later accounts are not so unfavourable; and in France it looks well. Carraway and Coriander have found a retail sale at former prices.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, new, Essex and Kent, white	42 to	50	red	40 to	46
Norfolk, Linc. and Yorks., red				39	45
BARLEY, malting	35 to	38	Chevalier	38	41
Distilling	32	35	Grinding	26	30
MALT, Essex, Norfolk, and Suffolk	58	66	extra	68	—
Kingston, Ware, and town made	58	66	,,	68	—
Brown	54	56		—	—
RYE	—	—		28	30
OATS, English, feed	22	26	Potato	28	35
Scotch, feed	22	27	Potato	26	34
Irish, feed, white	22	25	fine	26	32
Ditto, black	21	24	,,	—	26
BEANS, Mazagan	32	35	Ticks	33	34
Harrow	33	36	Pigeon	37	42
PEAS, white boilers .. 40 45..Maple	42	45	Grey	40	48
FLOUR, per sack of 280lbs., Town, Households..33s.			fine	37	40
Country	31	32	Households	33	34
Norfolk and Suffolk, ex-ship				29	30

FOREIGN GRAIN.

Shillings per Quarter.

WHEAT, Dantzic, mixed	46	—	high do.	—	—	extra	—	52
Konigsberg	40	48	,,	—	—		—	—
Rostock	43	—	fine	48	—		—	—
American, white	42	50	red	40	47		—	—
Pomera., Meckbg., & Uckermrk, red				42	47		—	—
Silesian, red	40	45				white	41	46
Danish and Holstein							38	45
Russian, hard	40	44	French	40	45	white	44	47
St. Petersburg and Riga							38	44
Rhine and Belgium							—	46
BARLEY, grinding	24	29				Distilling	32	34
OATS, Dutch, brew, and Polands				22	28	Feed	21	26
Danish and Swedish, feed				22	26	Stralsund	28	26
Russian							21	23
BEANS, Friesland and Holstein							34	35
Konigsberg				31	35	Egyptian	33	35
PEAS, feeding				40	42	fine boilers	42	44
INDIAN CORN, white				34	35	yellow	34	35
FLOUR, per sack			French	32	36	Spanish	—	—
American, per barrel, sour				18	22	sweet	22	24

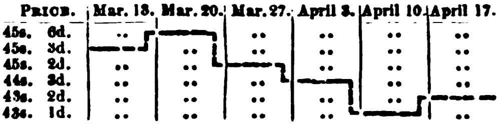
IMPERIAL AVERAGES.

For the last Six Weeks:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
March 13, 1858	45	3	36	6	23	3	31	3	37	11	41	2
March 20, 1858	45	6	36	9	23	4	31	9	37	11	41	0
March 27, 1858	45	2	37	3	23	4	29	11	38	1	41	5
April 3, 1858	44	3	36	10	23	5	31	3	38	4	41	9
April 10, 1858	43	1	36	3	24	1	30	9	38	6	41	1
April 17, 1858	43	2	36	7	24	7	30	4	38	10	41	5
Aggregate average	44	5	36	8	23	8	30	10	38	3	41	4
Sametime last year	54	9	46	3	23	11	38	8	39	8	39	0

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gaz.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat......	76,795 qrs.,	43	2	Wheat......	84,689 qrs.,	53	0
Barley......	29,353 ..	36		Barley......	22,428 ..	44	7
Oats.........	8,637 ..	24	7	Oats.........	7,973 ..	23	5
Rye	542 ..	30	4	Rye	110 ..	36	3
Beans	4,359 ..	38	10	Beans	6,184 ..	40	0
Peas.........	350 ..	41	5	Peas.........	769 ..	39	4

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 40s. to 50s., extra —s.,	white 50s. to 70s.
Trefoil	18s. to 22s.
Tares, Winter, new, per bushel	6s. 0d. to 7s. 0d.
Mustardseed, per bush., new 17s. to 25s., brown	13s. to 15s.
Coriander, per cwt.	20s. to 26s.
Canary, per qr.	84s. to 94s.
Linseed, per qr., sowing —s. to —s...crushing	62s. to 64s.
Linseed Cakes, per ton	£10 0s. to £10 10s.
Rapeseed, per qr.	68s. to 72s.
Rape Cake, per ton	£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

Cloverseed, red 40s. to 46s., ...	white 50s. to 60s.
Trefoil, ...	17s. to 21s.
Tares, Spring, per bushel	7s. 0d. to 8s. 0d.
Hempseed, small, per qr.	Dutch 42s. to 47s.
Coriander, per cwt.	17s. to 26s.
Carraway ,, ...	44s. to 46s.
Linseed, per qr., Baltic 59s. to 60s.....Bombay	59s. to 61s.
Linseed Cake, per ton	£10 0s. to £10 15s.
Rapeseed, Dutch	66s. to 72s.
Rape Cake, per ton	£5 0s. to £5 10s.

BREAD.

LONDON, SATURDAY, April 24.—No alteration in the prices of Bread.

Wheaten Bread, per 4lbs. Loaf	6d. to	7d.
Household Do.	4½d.	6d.

HAY MARKETS.

SATURDAY, April 24.—SMITHFIELD.—Supply good, and trade dull.

CUMBERLAND.—A full average supply, and a sluggish demand.

WHITECHAPEL.—Both hay and straw moved off slowly, at our quotations.

At per Load of 36 Trusses.

	Smithfield.	Cumberland.	Whitechapel
MEADOW HAY	50s. to 88s.	52s. to 88s.	50s. to 88s.
CLOVER DITTO	70s. 100s.	70s. 100s.	70s. 100s.
STRAW	26s. 32s.	27s. 32s.	26s. 32s.

CHICORY.

LONDON, SATURDAY, April 24.—For nearly all kinds of Chicory we have to report an improved demand; and, in some instances prices have an upward tendency.

ENGLISH, per ton	£12	0 to	£14	0	ANTWERP	£10	10 to	£11	0
HARLINGEN....	10	5	10	10	DACKUM	0	0	0	0
BRUGES	10	0	10	15	GUERNSEY	10	10	10	15
HAMBURG	11	0	11	5	BELGIUM........	10	10	11	0

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland	100 to	102	Cheshire	64	76
Kiel	102	106	Cheddar	72	82
Dorset	106	112	Double Gloucester	54	68
Carlow	96	104	HAMS:		
Waterford	96	104	York	78	8
Cork, ...	92	98	Westmoreland	78	8
Limerick	—	—	Irish	74	8
Sligo	—	—	BACON: Wiltshire, dried	68	7
Fresh, per dozen..12s. 0d. to 14s. 0d.			Irish, green	58	6

COVENT GARDEN MARKET.

LONDON, SATURDAY, April 24.—Trade is brisker than it was last week. Strawberries are making their appearance in larger quantities. Of Pears, Easter Beurré, and Ne Plus Meuris may still be obtained. Oranges of all kinds are good and abundant. Among Vegetables are Asparagus, Rhubarb, and Seakale. Winter Greens are plentiful. French salading is excellent; it still consists of Cabbage Lettuce, Barbe de Capucin, Batavian Endive, and Turnip Radishes. Cornish Broccoli realizes from 1d. to 3d. a head. French Beans are very plentiful. New Potatoes are making their appearance. They fetch from 2s 6d. to 3s. per lb.; Peas, from 3s. to 4s. per punnet; and green Artichokes, 6s. to 8s. per dozen. Cucumbers plentiful. Best samples of old Potatoes have advanced in price. Cut flowers chiefly consist of Orchids, Gardenias, Heliotropes, Poinsettia pulcherrima, Geraniums, Violets, Mignonette, Heaths, Primulas, Camellias, Cyclamens, Tulips, Hyacinths, and Roses.

FRUIT.

	s.	d.	s.	d.		s.	d.	s.	d.
Pineapples, per lb.	7	0 to	10	0	Pears, per doz.	6	0 to	18	0
Grapes, new, per lb.....	15	0	25	0	Apples, per half sieve..	3	0	6	0
Do., Portugal, per lb ..	3	0	5	0	Oranges, per doz.	0	6	1	0
Lemons, per dozen	1	0	2	0	Melons	0	0	0	0
Do., per 100	5	0	10	0	Filberts per 100lbs.	30	0	40	0
Strawberries, per oz. ..	0	6	1	0	Cobs, do.	35	0	40	0

VEGETABLES.

	s.	d.	s.	d.		s.	d.	s.	d.
Cauliflowers per doz	1	6 to	4	0	Tomatoes, per half-sieve	0	0 to	0	0
Broccoli, per bundle....	1	0	1	6	Leeks, per bunch	0	2	0	3
Greens, per doz. bunches	3	0	4	0	Celery, per bundle......	1	0	1	9
Seakale, per punnet	1	3	2	6	Shallots, per lb.	0	6	0	8
French Beans, per 100 ..	1	0	2	0	Garlic, per lb.	0	6	0	8
Asparagus, per bundle ..	3	0	7	0	Lettuce, cab., per dozen .	1	6	2	0
Rhubarb, per bundle....	0	6	1	0	Do., Cos, per dozen ..	5	0	6	0
Potatoes, per ton	80	0	109	0	Endive, per score	2	6	4	0
Do. per bush..........	2	0	2	9	Radishes, turnip, per doz.	0	0	0	0
Do. per cwt.	4	0	6	0	Horseradish, per bundle.	1	6	4	0
Do. New, per lb.......	0	6	2	0	Mushrooms, per pottle..	1	0	1	6
Carrots, new per bunch..	0	6	0	8	Parsley, per 12 bunches.	4	0	6	0
Turnips, per bunch	0	2	0	4	Basil, green, per bunch..	0	0	0	0
Spinach, per sieve	1	6	3	0	Marjoram, per bunch ...	0	0	0	0
Cucumbers, per dozen ..	10	0	18	0	Savory, per bunch	0	2	0	4
Beet, per dozen	1	0	2	0	Mint, green, per bunch..	1	0	1	3

SPIRITS.

LONDON, SATURDAY, April 24.—There is a slow inquiry for Rum, the stock of which is seasonably good, at our quotations. Brandy continues a dull inquiry, but we have no change to notice in its value. Grain spirit sells slowly, on former terms.

RUM.

	s.	d.	s	d.		s.	d.	s.	d.
E. India, proof per gal.	1	10 to	0	0	Jamaica . 26 to 30 O.P.	4	3 to	4	4
Leewards, do.	1	11	0	0	,, 32 36 ,,	4	6	4	8
,, 10 to 20 O.P.	2	4	3	0	Better qualities 32 36 ,,	4	4	4	9
,, 21 29 ,,	3	8	3	10					
Demerara 30 34 ,,	3	8	4	2	Superior Marks 36 40 ,,	5	3	6	0
,, 34 40 ,,	4	2	4	6					

BRANDY—COGNAC.

Vintage	Shipped by Martell. s.	d.	s.	d.	Shipped by Hennessy. s.	d.	s.	d.	Shipped by Otard. s.	d.	s.	d.	Shipped by Viny. Proprietors' Company. s.	d.	s.	d.
1854....	15	0	16	0	15	0	16	0	0	0	0	0	0	0	0	0
1855....	13	4	14	6	13	4	14	6	0	0	0	0	0	0	0	0

Hhds. 3d. per gallon higher. Puncheons scarce.

Other Shippers	6	6 to	12	0
HOLLANDS, Geneva fine, for duty	3	8	4	5
Other qualities, to arrive and on the quay	3	2	4	0
BRITISH GIN, for exportation, proof............... hhds	3	10	4	6

BRITISH SPIRITS.

GIN, proof, cash	10	0	0	0

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, April 26.—Owing, in some measure, to the approaching sales of colonial wool, at which nearly 60,000 bales will be brought forward, our market is in a very depressed state, and it is difficult to sell any kind of home-grown wool except on lower terms.

Per pack of 240lbs.

Fleeces—Southdown Hogs	£13	0 to	£14	0
Do. Half-bred Hogs	13	0	14	0
Do. Kent	13	0	14	0
Do. Southdown Ewes and Wethers	12	0	13	0
Do. Leicester do.	13	0	13	10
Sorts—Clothing, picklock	15	0	16	0
Do. Prime and picklock	14	0	14	10
Do. Choice	13	10	14	0
Do. Super	12	0	13	0
Do. Combing—Wether matching ...	15	0	16	0
Do. Picklock	13	0	14	0
Do. Common	12	0	12	10
Do. Hog matching	16	0	16	10
Do. Picklock matching...............	14	0	15	0
Do. Super do.	12	0	12	10

BRADFORD WOOL MARKET.—The transactions during the week and to-day are trivial. The supply of bright-haired wool is exceedingly limited: nor are staplers disposed to increase their stocks until the pending sales by auction are past. In prices there is but little alteration; but the tendency is downward. Noils and short wool are dull of sale, notwithstanding the very small quantity now producing. YARNS: There are more inquiries by the export houses, but not more sales making. Leipsic Easter fair is now on, where large quantities of worsted goods are usually sold by the German manufacturers, who draw their supplies of yarn from this market. A week or two hence, more business may be looked for from that quarter. The consumption by the home manufacturers is steady, but limited. Prices are ruinously low, and spinners strictly adhere to short time working, besides having much machinery unemployed. PIECES: The attendance of merchants is more numerous to-day. There is a fair amount of business doing in fancy goods suited to the approaching season, but there is no improvement in Coburgs or Orleans cloths. In coatings there is more doing.—*Second Edition of the Bradford Observer of Thursday last.*

LEEDS WOOL MARKET (ENGLISH AND FOREIGN) April 23.—Stocks of English wool are very light, as is generally the case at this season of the year, but they are amply sufficient for the demand. Many buyers are looking forward with interest to the approaching public sales at Halifax and Bradford. The prevailing opinion seems to be that the prices obtained at the last sales will not be again secured. The demand for yarns and pieces during the interval would seem to furnish ground for this opinion. Buyers of foreign wool are also looking forward to the next sales of colonial, and are not disposed to buy freely till prices are established. The opinion is that they will be lower, but some persons expect they will be about the same as last sales.

LIVERPOOL WOOL MARKET, APRIL 24.

SCOTCH.—There is more general inquiry for Laid Wool, at our quotations. White Highland is also more in demand. The late public sales of Cheviot, to close some old accounts, has rather depressed the market for the moment, and we have had little doing by private sale.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs.	11	6	to	12	0
White Highland do	14	6		16	0
Laid Crossed do..unwashed	13	0		14	0
Do. do..washed........	14	0		15	0
Laid Cheviot do..unwashed......	15	6		16	6
Do. do..washed........	17	0		20	0
White Cheviot do..washed........	28	0		30	0

FOREIGN.—Notwithstanding the prices were low at the public sales just closed, and the quantities sold were considerable, still the demand since for deep-grown Wools has been good, and fully late rates obtained. On the whole the market looks healthy.

FOREIGN AND COLONIAL WOOL MARKET.

	Per lb.	s.	d.		s.	d.
German, Saxon, and Prussian.	1st and 2nd Elect	3	4	to	4	6
	Prima	2	4		3	0
	Secunda	2	0		2	4
	Tertia	1	8		1	10
COLONIAL:—SYDNEY—	Lambs	1	5½		2	1½
	Scoured do.	1	4½		2	3
	Unwashed	0	9½		1	6
	Locks and Pieces.............	0	10		1	9
	Slipe and Skin	1	4		1	9
PORT PHILIP—	Lambs	1	4		2	1
	Scoured do..................	1	2½		2	3½
	Unwashed	0	6		1	1½
	Locks and Pieces............	1	1		1	7½
	Slipe and Skin...............	0	8½		1	6½
S. AUSTRALIAN—	Lambs	1	4		1	9
	Scoured do.	1	3		2	2
	Unwashed	0	9		0	11
	Locks and Pieces............	0	7		1	2
V. D LAND—	Lambs................	1	5½		1	11
	Scoured do..................	1	5		2	8
	Unwashed	1	1½		1	3
	Locks and Pieces............	1	0		1	6
CAPE OF GOOD HOPE—	Fleeces	0	11		2	0
	Lambs......................	0	11		1	10
	Scoured	0	8		1	10
	Unwashed...................	0	7½		1	3

MANURES.

PRICES CURRENT OF GUANO, &c.

	£	s.	d.		£	s.	d.
PERUVIAN GUANO, (per ton, for 30 tons) nominal	£13	5	0	to	£0	0	0
Do. Do. ....(under 30tons)....	14	0	0		0	0	0
BOLIVIAN GUANO ....none	0	0	0		0	0	0

ARTIFICIAL MANURES, &c.

	£ s. d.		£ s. d.		£ s. d.		£ s. d.
Nitrate Soda (per ton)...	£18 0 0	to	£20 0 0	Sulph. of Copper or Roman Vitriol, for Wheat steeping......	45 0 0	to	47 0 0
Nitrate Potash or Saltpetre	29 0 0		30 0 0	Salt............	1 0 0		1 10 0
Sulpht. Ammonia	19 10 0		20 0 0	Bones, Dust, per qr.	1 5 0		1 6 0
Muriate ditto...	27 0 0		28 0 0	Do. ½-inch......	1 4 0		1 5 0
Superphospht. of Lime....	5 10 0		6 0 0	Oil Vitriol, concentrated, per lb.........	0 0 1		0 0 0
Soda Ash, or Alkali......	9 0 0		10 0 0	Do. Brown.....	0 0 0½		0 0 0
Gypsum........	2 0 0		2 10 0				
Coprolite.......	3 10 0		3 15 0				

OIL-CAKES.

	£ s. d.		£ s. d.		£ s. d.		£ s. d.
Linseed-cakes, per ton—				Marseilles	£9 0 0	to	£9 10 0
Thin American, in brls. or bags	£9 15 0		£10 10 0	English.........	10 0 0		0 0 0
Thick do. round (none)			0 0 0	Rape-cakes, pr ton	5 10 0		6 10 0

JOHN KEEN, 35, Leadenhall-street,
(Late Odams, Pickford, and Keen.)

Williams & Co., 24, Mark Lane—Azotic.....................£6 10 0

Manufactured by Hodgson & Simpson, Wakefield, and
Matthews & Co., Driffield.

Ammonia-Phosphate and Nitro-Phosphate.................per ton £8 0 0
Superphosphate of Lime .... ,, 7 0 0

Agricultural Chemical Works, Stowmarket, Suffolk.

Prentice's Cereal Manure for Corn Crops...................per ton £8 10 0
Prentice's Turnip Manure .... ,, 7 0 0
Prentice's Superphosphate of Lime......................... ,, 6 10 0

Lancashire Manure Company, Widnes, near Warrington.

J. Knight & Co.'s Nitrogenised Bone Manures...............per ton £8 15 0

Manure Works, Grovehill, Beverley.

Tiger & Co.'s Celebrated Turnip Manures.....................per ton £7 10 0

TALLOW.

LONDON, MONDAY, April 26.—About an average time-of-year amount of business is doing in our market, and prices generally are well supported. P.Y.C., on the spot, is quoted at 55s. 6d.; for the last three months' delivery, 52s. 6d. per cwt. Rough Fat is 3s. 0½d. per 8lbs.

PARTICULARS OF TALLOW.

	1854.	1855.	1856.	1857.	1858.
	Casks.	Casks.	Casks	Casks.	Casks.
Stock this day ..	34102	31700	18593	11918	11691
Price of Y.C.....	64s. 0d. to 64s. 6d.	51s. 3d. to 54s. 6d.	47s. 0d. to —s. 0d.	53s. 3d. to —s. 0d.	55s. 9d. to —s. 0d.
Delivery last week	781	1820	3197	1971	1241
Do. from 1st June	89741	78227	99544	99324	97621
Arrived last week.	1082	958	411	216	441
Do. from 1st June	100618	73927	71595	94262	97599
Price of Town ..	64s. 9d.	59s. 6d.	50s. 6d.	58s. 0d.	58s. 0d.

FLAX, HEMP, COIR, &c.

LONDON, SATURDAY, April 24.—The demand for Flax still rules heavy, but we have no decline to notice in the quotations. Hemp is held at full currencies, viz., £30 per ton for Petersburg clean; but the inquiry for it is limited. Jute and Coir goods support previous rates.

HIDE AND SKIN MARKETS.

LONDON, SATURDAY, APRIL 24.

	s.	d.		s.	d.		s.	d.		s.	d.
MARKET HIDES:						HORSE HIDES, each	8	0	to	9	0
56 to 64lbs......per lb.	0	3	to	0	0	CALF SKINS, light.	2	0		2	6
64 to 72lbs............	0	3		0	3½	Do. full	5	6		6	0
72 to 80lbs............	0	3½		0	3½	Shearling	0	10		0	0
80 to 88lbs............	0	3½		0	3½	Kents & half-breds ..	6	0		7	0
88 to 96lbs............	0	3½		0	4	Downs	4	6		5	6
96 to 104lbs...........	0	4		0	4½	Polled Sheep	0	0		0	0
104 to 112lbs..........	0	0		0	0	Lambs	2	0		2	10

BIRMINGHAM, SATURDAY, APRIL 24.

HIDES.	Per lb. s.	d.		s.	d.	CALF.	Per lb. s.	d.		s.	d.
95lbs. and upwards..	0	0	..	0	4½	17lbs. and upwards..	0	5½	..	0	0
85lbs. to 94lbs.	0	0	..	0	4½	12lbs. to 16lbs.......	0	5½	..	0	0
75lbs. to 84lbs.	0	0	..	0	4	9lbs. to 11lbs.	0	5½	..	0	5½
65lbs. to 74lbs.	0	3½	..	0	3½	Light	0	4½	..	0	0
56lbs. to 64lbs.	0	3½	..	0	3½	Flawed and irregular	0	4½	..	0	0
55lbs. and under....	0	0	..	0	0						
Cows	0	2½	..	0	3	WOOLSKINS	4	0	..	7	3
Flawed and irregular	0	2½	..	0	2½	PELTS	0	8	..	1	1½
Horses each..........	0	0	..	0	6	LAMBS	0	5½	..	2	0
Bulls.................	0	0	..	0	3						

IMPERIAL AVERAGES.

For the last Six Weeks:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d	Peas. s.	d.
March 13, 1858	45	3	36	6	23	3	31	3	37	11	41	2
March 20, 1858	45	6	36	9	23	4	31	9	37	11	41	0
March 27, 1858	45	2	37	3	23	4	29	11	38	1	41	5
April 3, 1858	44	3	36	10	23	5	31	3	38	4	41	0
April 10, 1858	43	1	36	3	24	1	30	9	38	6	41	1
April 17, 1858	43	2	36	7	24	7	30	4	38	10	41	5
Aggregate average	44	5	36	8	23	8	30	10	38	3	41	4
Sametime last year	54	9	46	3	23	11	38	8	39	8	39	0

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
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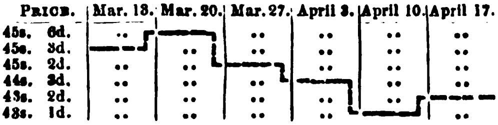
Oats.........	8,637 ..	24	7	Oats.........	7,973 ..	23	5
Rye	542 ..	30	4	Rye	110 ..	36	3
Beans	4,359 ..	38	10	Beans	6,184 ..	40	0
Peas.........	350 ..	41	5	Peas.........	769 ..	39	4

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 40s. to 50s., extra —s., white 50s. to 70s.
Trefoil .... 18s. to 22s.
Tares, Winter, new, per bushel ......6s. 0d. to 7s. 0d.
Mustardseed, per bush., new 17s. to 25s., brown 13s. to 15s.
Coriander, per cwt.............................. 20s. to 26s.
Canary, per qr.................................. 84s. to 94s.
Linseed, per qr., sowing —s. to —s...crushing 62s. to 64s.
Linseed Cakes, per ton .... £10 0s. to £10 10s.
Rapeseed, per qr.............................. 68s. to 72s.
Rape Cake, per ton.....................£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

Cloverseed, red 40s. to 46s., ... white 50s. to 60s.
Trefoil,.. 17s. to 21s.
Tares, Spring, per bushel .... 7s. 0d. to 8s. 0d.
Hempseed, small, per qr. .... Dutch 42s. to 47s.
Coriander, per cwt.............................. 17s. to 26s.
Carraway ,, ... 44s. to 46s.
Linseed, per qr., Baltic 59s. to 60s.....Bombay 59s. to 61s.
Linseed Cake, per ton................ £10 0s. to £10 15s.
Rapeseed, Dutch .... 66s. to 72s.
Rape Cake, per ton ....£5 0s. to £5 10s.

BREAD.

LONDON, SATURDAY, April 24.—No alteration in the prices of Bread.

Wheaten Bread, per 4lbs. Loaf............ 6d. to 7d.
Household Do. .. .. 4½d. 6d.

HAY MARKETS.

SATURDAY, April 24.—SMITHFIELD.—Supply good, and trade dull.

CUMBERLAND.—A full average supply, and a sluggish demand.

WHITECHAPEL.—Both hay and straw moved off slowly, at our quotattons.

At per Load of 36 Trusses.

	Smithfield.	Cumberland.	Whitechapel
MEADOW HAY	50s. to 88s.	52s. to 88s.	50s. to 88s.
CLOVER DITTO	70s. 100s.	70s. 100s.	70s. 100s.
STRAW	26s. 32s.	27s. 32s.	26s. 32s.

CHICORY.

LONDON, SATURDAY, April 24.—For nearly all kinds of Chicory we have to report an improved demand; and, in some instances prices have an upward tendency.

	£	s.		£	s.		£	s.		£	s.
ENGLISH, per ton	£12	0	to £14	0		ANTWERP	£10	10	to £11	0	
HARLINGEN....	10	5	10	10		DACKUM.........	0	0	0	0	
BRUGES	10	0	10	15		GUERNSEY	10	10	10	15	
HAMBURG	11	0	11	5		BELGIUM.........	10	10	11	0	

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland.................	100 to	102	Cheshire....................	64	76
Kiel........................	102	106	Cheddar....................	72	82
Dorset	108	112	Double Gloucester.........	54	68
Carlow....................	96	104	HAMS:		
Waterford...............	96	104	York.........................	78	8
Cork, ...	92	98	Westmoreland	78	8
Limerick	—	—	Irish	74	8
Sligo.......................	—	—	BACON: Wiltshire, dried	68	7
FRESH, per dozen..	12s. 0d. to	14s. 0d.	Irish, green	58	6

COVENT GARDEN MARKET.

LONDON, SATURDAY, April 24.—Trade is brisker than it was last week. Strawberries are making their appearance in larger quantities. Of Pears, Easter Beurré, and Ne Plus Meuris may still be obtained. Oranges of all kinds are good and abundant. Among Vegetables are Asparagus, Rhubarb, and Seakale. Winter Greens are plentiful. French salading is excellent; it still consists of Cabbage Lettuce, Barbe de Capucin, Batavian Endive, and Turnip Radishes. Cornish Broccoli realizes from 1d. to 3d. a head. French Beans are very plentiful. New Potatoes are making their appearance. They fetch from 2s 6d. to 3s. per lb.; Peas, from 3s. to 4s. per punnet; and green Artichokes, 6s. to 8s. per dozen. Cucumbers plentiful. Best samples of old Potatoes have advanced in price. Cut flowers chiefly consist of Orchids, Gardenias, Heliotropes, Poinsettia pulcherrima, Geraniums, Violets, Mignonette, Heaths, Primulas, Camellias, Cyclamens, Tulips, Hyacinths, and Roses.

FRUIT.

	s.	d.	s.	d.		s.	d.	s.	d.
Pineapples, per lb.	7	0 to	10	0	Pears, per doz.	6	0 to	10	0
Grapes, new, per lb.....	15	0	25	0	Apples, per half sieve..	3	0	6	0
Do., Portugal, per lb ..	3	0	5	0	Oranges, per doz.	0	6	1	0
Lemons, per dozen	1	0	2	0	Melons	0	0	0	0
Do., per 100	5	0	10	0	Filberts per 100lbs.	30	0	40	0
Strawberries, per oz. ..	0	6	1	0	Cobs, do..................	35	0	40	0

VEGETABLES.

	s.	d.	s.	d.		s.	d.	s.	d.
Cauliflowers per doz	1	6 to	4	0	Tomatoes, per half-sieve	0	0 to	0	0
Broccoli, per bundle....	1	0	1	6	Leeks, per bunch	0	2	0	3
Greens, per doz. bunches	3	0	4	0	Celery, per bundle........	1	0	1	9
Seakale, per punnet	1	3	2	6	Shallots, per lb.	0	6	0	8
French Beans, per 100 ..	1	0	2	0	Garlic, per lb.	0	6	0	8
Asparagus, per bundle ..	3	0	7	0	Lettuce, cab., per dozen .	1	6	2	0
Rhubarb, per bundle....	0	6	1	0	Do., Cos, per dozen ..	5	0	6	0
Potatoes, per ton	60	0	109	0	Endive, per score	2	6	4	0
Do. per bush...........	2	0	2	9	Radishes, turnp, per doz.	0	0	0	0
Do. per cwt............	4	0	6	0	Horseradish, per bundle.	1	6	4	0
Do. New, per lb.......	0	6	2	0	Mushrooms, per pottle..	1	0	1	6
Carrots, new per bunch..	0	6	0	8	Parsley, per 12 bunches.	4	0	6	0
Turnips, per bunch	0	2	0	4	Basil, green, per bunch..	0	0	0	0
Spinach, per sieve	1	6	3	0	Marjoram, per bunch ...	0	0	0	0
Cucumbers, per dozen ..	10	0	18	0	Savory, per bunch	0	2	0	4
Beet, per dozen	1	0	2	0	Mint, green, per bunch..	1	0	1	3

SPIRITS.

LONDON, SATURDAY, April 24.—There is a slow inquiry for Rum, the stock of which is seasonably good, at our quotations. Brandy continues a dull inquiry, but we have no change to notice in its value. Grain spirit sells slowly, on former terms.

RUM.

	s.	d.	s.	d.		s.	d.	s.	d.
E. India, proof per gal.	1	10 to	0	0	Jamaica. 26 to 29 O.P.	4	3 to	4	4
Leewards, do.........	1	11	0	0	,, 32 36 ,,	4	6	4	8
,, 10 o 20 O.P.	2	4	3	0	Better qualities 32 36 ,,	4	4	4	9
,, 21 29 ,,	3	8	3	10	Superior Marks 36 40 ,,	5	3	6	0
Demerara 30 34 ,,	3	8	4	2					
,, 34 40 ,,	4	2	4	6					

BRANDY—COGNAC.

Vintage	Shipped by Martell.				Shipped by Hennessy.				Shipped by Otard.				Shipped by Viny. Proprietors' Company.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1854....	15	0	16	0	15	0	16	0	0	0	0	0	0	0	0	0
1855....	13	4	14	6	13	4	14	6	0	0	0	0	0	0	0	0

Hhds. 2d. per gallon higher. Puncheons scarce.

	s.	d.	s.	d.
Other Shippers..................................	6	6	to 12	0
HOLLANDS, Geneva fine, for duty	3	5	4	5
Other qualities, to arrive and on the quay	3	2	4	0
BRITISH GIN, for exportation, proof.............. hhds	3	10	4	6

BRITISH SPIRITS.

	s.	d.	s.	d.
GIN, proof, cash	10	0	0	0

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, April 26.—Owing, in some measure, to the approaching sales of colonial wool, at which nearly 60,000 bales will be brought forward, our market is in a very depressed state, and it is difficult to sell any kind of home-grown wool except on lower terms.

Per pack of 240lbs.

	£	s.	£	s.
Fleeces—Southdown Hogs.............	£13	0 to	£14	0
Do. Half-bred Hogs	13	0	14	0
Do. Kent	13	0	14	0
Do. Southdown Ewes and Wethers	12	0	13	0
Do. Leicester do.	13	0	13	10
Sorts—Clothing, picklock	15	0	16	0
Do. Prime and picklock	14	0	14	10
Do. Choice.........................	13	10	14	6
Do. Super..........................	12	0	13	0
Do. Combing—Wether matching ...	15	0	16	0
Do. Picklock	13	0	14	0
Do. Common	12	0	12	10
Do. Hog matching	16	6	16	10
Do. Picklock matching.............	14	0	15	0
Do. Super do.	12	0	12	10

BRADFORD WOOL MARKET.—The transactions during the week and to-day are trivial. The supply of bright-haired wool is exceedingly limited: nor are staplers disposed to increase their stocks until the pending sales by auction are past. In prices there is but little alteration; but the tendency is downward. Noils and short wool are dull of sale, notwithstanding the very small quantity now producing. YARNS: There are more inquiries by the export houses, but not more sales making. Leipsic Easter fair is now on, where large quantities of worsted goods are usually sold by the German manufacturers, who draw their supplies of yarn from this market. A week or two hence, more business may be looked for from that quarter. The consumption by the home manufacturers is steady, but limited. Prices are ruinously low, and spinners strictly adhere to short time working, besides having much machinery unemployed. PIECES: The attendance of merchants is more numerous to-day. There is a fair amount of business doing in fancy goods suited to the approaching season, but there is no improvement in Coburgs or Orleans cloths. In coatings there is more doing.—*Second Edition of the Bradford Observer of Thursday last.*

LEEDS WOOL MARKET (ENGLISH AND FOREIGN) April 23.—Stocks of English wool are very light, as is generally the case at this season of the year, but they are amply sufficient for the demand. Many buyers are looking forward with interest to the approaching public sales at Halifax and Bradford. The prevailing opinion seems to be that the prices obtained at the last sales will not be again secured. The demand for yarns and pieces during the interval would seem to furnish ground for this opinion. Buyers of foreign wool are also looking forward to the next sales of colonial, and are not disposed to buy freely till prices are established. The opinion is that they will be lower, but some persons expect they will be about the same as last sales.

LIVERPOOL WOOL MARKET, APRIL 24.

SCOTCH.—There is more general inquiry for Laid Wool, at our quotations. White Highland is also more in demand. The late public sales of Cheviot, to close some old accounts, has rather depressed the market for the moment, and we have had little doing by private sale.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs.		11	6	to	12	0
White Highland do		14	6		16	0
Laid Crossed	do..unwashed	13	0		14	0
Do.	do..washed	14	0		15	0
Laid Cheviot	do..unwashed	15	6		16	6
Do.	do..washed	17	0		20	0
White Cheviot	do..washed	28	0		30	0

FOREIGN.—Notwithstanding the prices were low at the public sales just closed, and the quantities sold were considerable, still the demand since for deep-grown Wools has been good, and fully late rates obtained. On the whole the market looks healthy.

FOREIGN AND COLONIAL WOOL MARKET.

	Per lb.	s.	d.		s.	d.
German, Saxon, and Prussian.	1st and 2nd Elect	3	4	to	4	6
	Prima	2	4		3	0
	Secunda	2	0		2	4
	Tertia	1	8		1	10
COLONIAL:—SYDNEY	—Lambs	1	8½		2	1½
	Scoured do.	1	4½		2	8
	Unwashed	0	9½		1	6
	Locks and Pieces	0	10		1	0
	Slipe and Skin	1	4		1	9
PORT PHILIP	—Lambs	1	4		2	1
	Scoured do.	1	2½		2	3½
	Unwashed	0	6		1	1½
	Locks and Pieces	1	1		1	7½
	Slipe and Skin	0	8½		1	6½
S. AUSTRALIAN	—Lambs	1	4		1	9
	Scoured do.	1	3		2	2
	Unwashed	0	9		0	11
	Locks and Pieces	0	7		1	2
V. D LAND	—Lambs	1	5½		1	11
	Scoured do.	1	5		2	8
	Unwashed	1	1½		1	3
	Locks and Pieces	1	0		1	6
CAPE OF GOOD HOPE	—Fleeces	0	11		2	0
	Lambs	0	11		1	10
	Scoured	0	8		1	10
	Unwashed	0	7½		1	3

MANURES.

PRICES CURRENT OF GUANO, &c.

	£	s.	d.		£	s.	d.
PERUVIAN GUANO, (per ton, for 30 tons) nominal	£13	5	0	to	£0	0	0
Do. Do. (under 30tons)	14	0	0		0	0	0
BOLIVIAN GUANO none	0	0	0		0	0	0

ARTIFICIAL MANURES, &c.

	£	s.	d.		£	s.	d.
Nitrate Soda (per ton)	£18	0	0	to	£20	0	0
Nitrate Potash or Saltpetre	29	0	0		30	0	0
Sulpht. Ammonia	19	10	0		20	0	0
Muriate ditto	27	0	0		28	0	0
Superphospht. of Lime	5	10	0		6	0	0
Soda Ash, or Alkali	9	0	0		10	0	0
Gypsum	2	0	0		2	10	0
Coprolite	3	10	0		3	15	0
Sulph. of Copper or Roman Vitriol, for Wheat steeping	45	0	0	to	47	0	0
Salt	1	0	0		1	10	0
Bones, Dust, per qr.	1	5	0		1	6	0
Do. ½-inch	1	4	0		1	5	0
Oil Vitriol, concentrated, per lb.	0	0	1		0	0	0
Do. Brown	0	0	0¾		0	0	0

OIL-CAKES.

	£	s.	d.		£	s.	d.
Linseed-cakes, per ton— Thin American, in brls. or bags	£9	15	0		£10	10	0
Thick do. round (none)					0	0	0
Marseilles	£9	0	0	to	£9	10	0
English	10	0	0		0	0	0
Rape-cakes, pr ton	5	10	0		6	10	0

JOHN KEEN, 35, Leadenhall-street,
(Late Odams, Pickford, and Keen.)

Williams & Co., 24, Mark Lane—Azotic……………£6 10 0

Manufactured by Hodgson & Simpson, Wakefield, and Matthews & Co., Driffield.

Ammonia-Phosphate and Nitro-Phosphate……………per ton £8 0 0
Superphosphate of Lime…………… ,, 7 0 0

Agricultural Chemical Works, Stowmarket, Suffolk.

Prentice's Cereal Manure for Corn Crops……………per ton £8 10 0
Prentice's Turnip Manure…………… ,, 7 0 0
Prentice's Superphosphate of Lime…………… ,, 6 10 0

Lancashire Manure Company, Widnes, near Warrington.

J. Knight & Co.'s Nitrogenised Bone Manures……………per ton £8 15 0

Manure Works, Grovehill, Beverley.

Tiger & Co.'s Celebrated Turnip Manures……………per ton £7 10 0

TALLOW.

LONDON, MONDAY, April 26.—About an average time-of-year amount of business is doing in our market, and prices generally are well supported. P.Y.C., on the spot, is quoted at 55s. 6d.; for the last three months' delivery, 52s. 6d. per cwt. Rough Fat is 3s. 0½d. per 8lbs.

PARTICULARS OF TALLOW.

	1854.	1855.	1856.	1857.	1858.
	Casks.	Casks.	Casks	Casks.	Casks.
Stock this day	34102	31700	18593	11918	11691
Price of Y.C.	64s. 0d. to 64s. 6d.	51s. 3d. to 54s. 6d.	47s. 0d. to —s. 0d.	53s. 3d. to —s. 0d.	55s. 9d. to —s. 0d.
Delivery last week	781	1820	8197	1971	1241
Do. from 1st June	89741	78227	99544	99324	97621
Arrived last week	1082	958	411	216	441
Do. from 1st June	100618	73927	71595	94262	97599
Price of Town	64s. 9d.	59s. 6d.	50s. 6d.	58s. 0d.	58s. 0d.

FLAX, HEMP, COIR, &c.

LONDON, SATURDAY, April 24.—The demand for Flax still rules heavy, but we have no decline to notice in the quotations. Hemp is held at full currencies, viz., £20 per ton for Petersburg clean; but the inquiry for it is limited. Jute and Coir goods support previous rates.

HIDE AND SKIN MARKETS.

LONDON, SATURDAY, APRIL 24.

MARKET HIDES:	s.	d.		s.	d.
56 to 64lbs. per lb.	0	3	to	0	0
64 to 72lbs.	0	3		0	3¼
72 to 80lbs.	0	3¼		0	3½
80 to 88lbs.	0	3½		0	3¾
88 to 96lbs.	0	3¾		0	4
96 to 104lbs.	0	4		0	4¼
104 to 112lbs.	0	0		0	0

	s.	d.		s.	d.
HORSE HIDES, each	8	0	to	9	0
CALF SKINS, light	2	0		2	6
Do. full	5	6		6	0
Shearling	0	10		0	0
Kents & half-breds	6	0		7	0
Downs	4	6		5	6
Polled Sheep	0	0		0	0
Lambs	2	0		2	10

BIRMINGHAM, SATURDAY, APRIL 24.

HIDES. Per lb.	s.	d.		s.	d.
95lbs. and upwards	0	0	..	0	4½
85lbs. to 94lbs.	0	0	..	0	4¼
75lbs. to 84lbs.	0	0	..	0	4
65lbs. to 74lbs.	0	3¾	..	0	3¾
56lbs. to 64lbs.	0	3½	..	0	3½
55lbs. and under	0	0	..	0	0
Cows	0	2¾	..	0	3
Flawed and irregular	0	2½	..	0	2¾
Horse each	0	0	..	0	0
Bulls	0	0	..	0	3

CALF. Per lb.	s.	d.		s.	d.
17lbs. and upwards	0	5½	..	0	0
12lbs. to 16lbs.	0	5¼	..	0	0
9lbs. to 11lbs.	0	5¼	..	0	5½
Light	0	4½	..	0	0
Flawed and irregular	0	4½	..	0	0
WOOL SKINS	4	0	..	7	3
PELTS	0	8	..	1	1½
LAMBS	0	5½	..	2	0

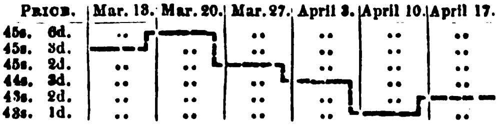
IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d	Peas. s.	d.
March 13, 1858	45	3	36	6	23	3	31	3	37	11	41	2
March 20, 1858	45	6	36	9	22	4	31	9	37	11	41	0
March 27, 1858	45	2	37	3	23	4	29	11	38	1	41	5
April 3, 1858	44	3	36	10	23	5	31	3	38	4	41	0
April 10, 1858	43	1	36	3	24	1	30	9	38	6	41	1
April 17, 1858	43	2	36	7	24	7	30	4	38	10	41	5
Aggregate average	44	5	36	8	23	8	30	10	38	3	41	4
Sametime last year	54	9	46	3	23	11	38	8	39	8	39	0

COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat......	76,795 qrs.,	43	2	Wheat......	84,689 qrs.,	53	0
Barley......	29,358 ..	36		Barley......	22.428 ..	44	7
Oats........	8,637 ..	24	7	Oats........	7,973 ..	23	5
Rye	542 ..	30	4	Rye	110 ..	36	3
Beans	4,359 ..	38	10	Beans	6,184 ..	40	0
Peas........	350 ..	41	5	Peas........	769 ..	39	4

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



PRICES OF SEEDS.

BRITISH SEEDS.

CLOVERSEED, red 40s. to 50s., extra —s., white 50s. to 70s.
TREFOIL .... 18s. to 22s.
TARES, Winter, new, per bushel ......6s. 0d. to 7s. 0d.
MUSTARDSEED, per bush., new 17s. to 25s., brown 13s. to 15s.
CORIANDER, per cwt.............................. 20s. to 26s.
CANARY, per qr.............................. 84s. to 94s.
LINSEED, per qr., sowing —s. to —s...crushing 62s. to 64s.
LINSEED CAKES, per ton .... £10 0s. to £10 10s.
RAPESEED, per qr.............................. 68s. to 72s.
RAPE CAKE, per ton......................£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

CLOVERSEED, red 40s. to 46s., ... white 50s. to 60s.
TREFOIL.................................... 17s. to 21s.
TARES, Spring, per bushel .... 7s. 0d. to 8s. 0d.
HEMPSEED, small, per qr. .... Dutch 42s. to 47s.
CORIANDER, per cwt.............................. 17s. to 26s.
CARRAWAY ,, ... 44s. to 46s.
LINSEED, per qr., Baltic 59s. to 60s.....Bombay 59s. to 61s.
LINSEED CAKE, per ton.............. £10 0s. to £10 15s.
RAPESEED, Dutch .... 66s. to 72s.
RAPE CAKE, per ton ....£5 0s. to £5 10s.

BREAD.

LONDON, SATURDAY, April 24.—No alteration in the prices of Bread.

WHEATEN BREAD, per 4lbs. Loaf............	6d. to	7d.
HOUSEHOLD Do.	4½d.	6d.

HAY MARKETS.

SATURDAY, April 24.—SMITHFIELD.—Supply good, and trade dull.

CUMBERLAND.—A full average supply, and a sluggish demand.

WHITECHAPEL.—Both hay and straw moved off slowly, at our quotations.

At per Load of 36 Trusses.

	SMITHFIELD.		CUMBERLAND.		WHITECHAPEL	
MEADOW HAY	50s. to	88s.	52s. to	88s.	50s. to	88s.
CLOVER DITTO	70s.	100s.	70s.	100s.	70s.	100s.
STRAW	26s.	32s.	27s.	32s.	26s.	32s.

CHICORY.

LONDON, SATURDAY, April 24.—For nearly all kinds of Chicory we have to report an improved demand; and, in some instances prices have an upward tendency.

ENGLISH, per ton	£12	0 to	£14	0	ANTWERP	£10	10 to	£11	0
HARLINGEN....	10	5	10	10	DACKUM........	0	0	0	0
BRUGES	10	0	10	15	GUERNSEY	10	10	10	15
HAMBURG	11	0	11	5	BELGIUM........	10	10	11	0

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland	100 to	102	Cheshire..................	64	76
Kiel........................	102	106	Cheddar..................	72	82
Dorset	108	112	Double Gloucester........	54	68
Carlow....................	96	104	HAMS:		
Waterford................	96	104	York......................	78	8
Cork, ...	92	96	Westmoreland	78	8
Limerick	—	—	Irish	74	8
Sligo......................	—	—	BACON: Wiltshire, dried	68	7
FRESH, per dozen..12s. 0d. to 14s. 0d.			Irish, green	58	6

COVENT GARDEN MARKET.

LONDON, SATURDAY, April 24.—Trade is brisker than it was last week. Strawberries are making their appearance in larger quantities. Of Pears, Easter Beurré, and Ne Plus Meuris may still be obtained. Oranges of all kinds are good and abundant. Among Vegetables are Asparagus, Rhubarb, and Seakale. Winter Greens are plentiful. French salading is excellent; it still consists of Cabbage Lettuce, Barbe de Capucin, Batavian Endive, and Turnip Radishes. Cornish Broccoli realizes from 1d. to 3d. a head. French Beans are very plentiful. New Potatoes are making their appearance. They fetch from 2s 6d. to 3s. per lb.; Peas, from 3s. to 4s. per punnet; and green Artichokes, 6s. to 8s. per dozen. Cucumbers plentiful. Best samples of old Potatoes have advanced in price. Cut flowers chiefly consist of Orchids, Gardenias, Heliotropes, Poinsettia pulcherrima, Geraniums, Violets, Mignonette, Heaths, Primulas, Camellias, Cyclamens, Tulips, Hyacinths, and Roses.

FRUIT.

	s.	d.	s.	d.		s.	d.	s.	d.
Pineapples, per lb.	7	0 to	10	0	Pears, per doz.	6	0 to	10	0
Grapes, new, per lb.....	15	0	25	0	Apples, per half sieve..	3	0	6	0
Do., Portugal, per lb ..	3	0	5	0	Oranges, per doz.	0	6	1	0
Lemons, per dozen	1	0	2	0	Melons	0	0	0	6
Do., per 100	5	0	10	0	Filberts per 100lbs.....	30	0	40	0
Strawberries, per oz. ..	0	6	1	0	Cobs, do................	35	0	40	0

VEGETABLES.

	s.	d.	s.	d.		s.	d.	s.	d.
Cauliflowers per doz	1	6 to	4	0	Tomatoes, per half-sieve	0	0 to	0	0
Broccoli, per bundle....	1	0	1	6	Leeks, per bunch	0	2	0	3
Greens, per doz. bunches	3	0	4	0	Celery, per bundle......	1	0	1	9
Seakale. per punnet	1	3	2	6	Shallots, per lb.	0	6	0	8
French Beans, per 100 ..	1	0	2	0	Garlic, per lb.	0	6	0	8
Asparagus, per bundle ..	3	0	7	0	Lettuce, cab., per dozen .	1	6	2	0
Rhubarb, per bundle....	0	6	1	0	Do., Cos, per dozen ..	5	0	6	0
Potatoes, per ton	60	0	109	0	Endive, per score	2	0	4	0
Do. per bush..........	2	0	2	9	Radishes, turnp, per doz.	0	0	0	0
Do. per cwt.	4	0	6	0	Horseradish, per bundle.	1	6	4	0
Do. New, per lb.......	0	6	2	0	Mushrooms, per pottle..	1	0	1	6
Carrots, new per bunch..	0	6	0	8	Parsley, per 12 bunches.	4	0	6	0
Turnips, per bunch	0	2	0	4	Basil, green, per bunch..	0	0	0	0
Spinach, per sieve	1	6	3	0	Marjoram, per bunch ...	0	0	0	0
Cucumbers, per dozen ..	10	0	18	0	Savory, per bunch	0	2	0	4
Beet, per dozen	1	0	2	0	Mint, green, per bunch..	1	0	1	3

SPIRITS.

LONDON, SATURDAY, April 24.—There is a slow inquiry for Rum, the stock of which is seasonably good, at our quotations. Brandy continues a dull inquiry, but we have no change to notice in its value. Grain spirit sells slowly, on former terms.

RUM.

				s.	d.		s	d.					s.	d.		s.	d.
E. India, proof per gal.				1	10	to	0	0	Jamaica.	26 to	29 O.P.		4	3	to	4	4
Leewards, do.				1	11		0	0	,,	32	36	,,	4	6		4	8
,,	10	to 20	O.P.	2	4		3	0	Better qualities	32	36	,,	4	4		4	9
,,	21	29	,,	3	8		3	10	Superior Marks	36	40	,,	5	3		6	0
Demerara	30	34	,,	3	8		4	2									
,,	34	40	,,	4	2		4	6									

BRANDY—COGNAC.

Vintage	Shipped by Martell.				Shipped by Hennessy.				Shipped by Otard.				Shipped by Viny. Proprietors' Company.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1854....	15	0	16	0	15	0	16	0	0	0	0	0	0	0	0	0
1855....	13	4	14	6	13	4	14	6	0	0	0	0	0	0	0	0

Hhds. 2d. per gallon higher. Puncheons scarce.

Other Shippers..	6	6 to	12	0
HOLLANDS, Geneva fine, for duty	3	8	4	5
Other qualities, to arrive and on the quay	3	2	4	0
BRITISH GIN, for exportation, proof..................hhds	3	10	4	6

BRITISH SPIRITS.

GIN, proof, cash	10	0	0	0

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, MONDAY, April 26.—Owing, in some measure, to the approaching sales of colonial wool, at which nearly 60,000 bales will be brought forward, our market is in a very depressed state, and it is difficult to sell any kind of home-grown wool except on lower terms.

Per pack of 240lbs.

Fleeces—Southdown Hogs..............		£13	0 to	£14	0
Do.	Half-bred Hogs	13	0	14	0
Do.	Kent	13	0	14	0
Do.	Southdown Ewes and Wethers	13	0	13	0
Do.	Leicester do.	13	0	13	10
Sorts—Clothing, picklock		15	0	16	0
Do.	Prime and picklock	14	0	14	10
Do.	Choice......................	13	10	14	0
Do.	Super.......................	12	0	13	0
Do.	Combing—Wether matching ...	15	0	16	0
Do.	Picklock	13	0	14	0
Do.	Common	12	0	12	10
Do.	Hog matching	16	0	16	10
Do.	Picklock matching..........	14	0	15	0
Do.	Super do.	12	0	12	10

BRADFORD WOOL MARKET.—The transactions during the week and to-day are trivial. The supply of bright-haired wool is exceedingly limited: nor are staplers disposed to increase their stocks until the pending sales by auction are past. In prices there is but little alteration; but the tendency is downward. Noils and short wool are dull of sale, notwithstanding the very small quantity now producing. YARNS: There are more inquiries by the export houses, but not more sales making. Leipsic Easter fair is now on, where large quantities of worsted goods are usually sold by the German manufacturers, who draw their supplies of yarn from this market. A week or two hence, more business may be looked for from that quarter. The consumption by the home manufacturers is steady, but limited. Prices are ruinously low, and spinners strictly adhere to short time working, besides having much machinery unemployed. PIECES: The attendance of merchants is more numerous to-day. There is a fair amount of business doing in fancy goods suited to the approaching season, but there is no improvement in Coburgs or Orleans cloths. In coatings there is more doing.—*Second Edition of the Bradford Observer of Thursday last.*

LEEDS WOOL MARKET (ENGLISH AND FOREIGN) April 23.—Stocks of English wool are very light, as is generally the case at this season of the year, but they are amply sufficient for the demand. Many buyers are looking forward with interest to the approaching public sales at Halifax and Bradford. The prevailing opinion seems to be that the prices obtained at the last sales will not be again secured. The demand for yarns and pieces during the interval would seem to furnish ground for this opinion. Buyers of foreign wool are also looking forward to the next sales of colonial, and are not disposed to buy freely till prices are established. The opinion is that they will be lower, but some persons expect they will be about the same as last sales.

LIVERPOOL WOOL MARKET, APRIL 24.

SCOTCH.—There is more general inquiry for Laid Wool, at our quotations. White Highland is also more in demand. The late public sales of Cheviot, to close some old accounts, has rather depressed the market for the moment, and we have had little doing by private sale.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs.	11	6	to	12	0
White Highland do	14	6		16	0
Laid Crossed do..unwashed	13	0		14	0
Do. do..washed.........	14	0		15	0
Laid Cheviot do..unwashed......	15	6		16	6
Do. do..washed.........	17	0		20	0
White Cheviot do..washed........	28	0		30	0

FOREIGN.—Notwithstanding the prices were low at the public sales just closed, and the quantities sold were considerable, still the demand since for deep-grown Wools has been good, and fully late rates obtained. On the whole the market looks healthy.

FOREIGN AND COLONIAL WOOL MARKET.

	Per lb.	s.	d.		s.	d.
German, Saxon, and Prussian.	1st and 2nd Elect	3	4	to	4	6
	Prima	2	4		3	0
	Secunda	2	0		2	4
	Tertia	1	8		1	10
COLONIAL:—SYDNEY—	Lambs	1	5½		2	1½
	Scoured do.	1	4½		2	8
	Unwashed	0	9½		1	6
	Locks and Pieces............	0	10		1	9
	Slipe and Skin	1	4		1	9
PORT PHILIP—	Lambs	1	4		2	1
	Scoured do..................	1	2½		2	3½
	Unwashed	0	6		1	1½
	Locks and Pieces............	1	1		1	7½
	Slipe and Skin..............	0	8½		1	6½
S. AUSTRALIAN—	Lambs	1	4		1	9
	Scoured do.	1	3		2	2
	Unwashed	0	9		0	11
	Locks and Pieces............	0	7		1	2
V. D LAND—	Lambs.................	1	5½		1	11
	Scoured do..................	1	5		2	8
	Unwashed	1	1½		1	3
	Locks and Pieces............	1	0		1	6
CAPE OF GOOD HOPE—	Fleeces	0	11		2	0
	Lambs.......................	0	11		1	10
	Scoured	0	8		1	10
	Unwashed....................	0	7½		1	8

MANURES.

PRICES CURRENT OF GUANO, &c.

PERUVIAN GUANO, (per ton, for 30 tons) nominal	£13	5	0	to	£ 0	0	0
Do. Do. ....(under 30tons)....	14	0	0		0	0	0
BOLIVIAN GUANO ....none	0	0	0		0	0	0

ARTIFICIAL MANURES, &c.

				£ s. d.	£ s. d.
Nitrate Soda (per ton)...	£18 0 0 to	£20 0 0	Sulph. of Copper or Roman Vitriol, for Wheat steeping......	45 0 0 to	47 0 0
Nitrate Potash or Saltpetre	29 0 0	30 0 0	Salt	1 0 0	1 10 0
Sulpht. Ammonia	19 10 0	20 0 0	Bones, Dust, per qr.	1 5 0	1 6 0
Muriate ditto ...	27 0 0	28 0 0	Do. ½-inch......	1 4 0	1 5 0
Superphospht. of Lime....	5 10 0	6 0 0	Oil Vitriol, concentrated, per lb.........	0 0 1	0 0 0
Soda Ash, or Alkali	9 0 0	10 0 0	Do. Brown.....	0 0 0½	0 0 0
Gypsum.........	2 0 0	2 10 0			
Coprolite.......	3 10 0	3 15 0			

OIL-CAKES.

Linseed-cakes, per ton—			Marseilles	£9 0 0 to	£9 10 0
Thin American, in brls. or bags	£9 15 0	£10 10 0	English..........	10 0 0	0 0 0
Thick do. round (none)		0 0 0	Rape-cakes, pr ton	5 10 0	6 10 0

JOHN KEEN, 35, Leadenhall-street,
(Late Odams, Pickford, and Keen.)

Williams & Co., 24, Mark Lane—Azotic..............................£6 10 0

Manufactured by Hodgson & Simpson, Wakefield, and
Matthews & Co., Driffield.

Ammonia-Phosphate and Nitro-Phosphate..................per ton £8 0 0
Superphosphate of Lime .... ,, 7 0 0

Agricultural Chemical Works, Stowmarket, Suffolk.

Prentice's Cereal Manure for Corn Crops....................per ton £8 10 0
Prentice's Turnip Manure .... ,, 7 0 0
Prentice's Superphosphate of Lime............................ ,, 6 10 0

Lancashire Manure Company, Widnes, near Warrington.

J. Knight & Co.'s Nitrogenised Bone Manures............per ton £8 15 0

Manure Works, Grovehill, Beverley.

Tiger & Co.'s Celebrated Turnip Manures.................per ton £7 10 0

TALLOW.

LONDON, MONDAY, April 26.—About an average time-of-year amount of business is doing in our market, and prices generally are well supported. P.Y.C., on the spot, is quoted at 55s. 6d.; for the last three months' delivery, 52s. 6d. per cwt. Rough Fat is 3s. 0½d. per 8lbs.

PARTICULARS OF TALLOW.

	1854.	1855.	1856.	1857.	1858.
	Casks.	Casks.	Casks	Casks.	Casks.
Stock this day ..	34102	31700	18593	11918	11691
Price of Y.C.	64s. 0d. to 64s. 6d.	51s. 3d. to 54s. 6d.	47s. 0d. to —s. 0d.	53s. 3d. to —s. 0d.	55s. 9d. to —s. 0d.
Delivery last week	781	1820	3197	1971	1241
Do. from 1st June	89741	782x7	99544	99324	97621
Arrived last week.	1082	958	411	216	441
Do. from 1st June	100618	73927	71595	94262	97599
Price of Town ..	64s. 9d.	59s. 6d.	50s. 6d.	58s. 0d.	58s. 0d.

FLAX, HEMP, COIR, &c.

LONDON, SATURDAY, April 24.—The demand for Flax still rules heavy, but we have no decline to notice in the quotations. Hemp is held at full currencies, viz., £30 per ton for Petersburg clean; but the inquiry for it is limited. Jute and Coir goods support previous rates.

HIDE AND SKIN MARKETS.

LONDON, SATURDAY, APRIL 24.

	s.	d.		s.	d.		s.	d.		s.	d.
MARKET HIDES:						HORSE HIDES, each	8	0	to	9	0
56 to 64lbs......per lb.	0	3	to	0	0	CALF SKINS, light.	2	0		2	6
64 to 72lbs............	0	3		0	3½	Do. full	5	6		6	0
72 to 80lbs............	0	3½		0	3½	Shearling	0	10		0	0
80 to 88lbs............	0	3½		0	3½	Kents & half-breds ..	6	0		7	0
88 to 96lbs............	0	3½		0	4	Downs	4	6		5	6
96 to 104lbs...........	0	4		0	4½	Polled Sheep	0	0		0	0
104to112lbs...........	0	0		0	0	Lambs	2	0		2	10

BIRMINGHAM, SATURDAY, APRIL 24.

HIDES.	Per lb. s.	d.		s.	d.	CALF.	Per lb. s.	d.		s.	d.
95lbs. and upwards..	0	0	..	0	4½	17lbs. and upwards..	0	5½	..	0	0
85lbs. to 94lbs.	0	0	..	0	4½	12lbs. to 16lbs.......	0	5½	..	0	0
75lbs. to 84lbs.......	0	0	..	0	4	9lbs. to 11lbs.	0	5½	..	0	5½
65lbs. to 74lbs.......	0	3½	..	0	3½	Light	0	4½	..	0	0
56lbs. to 64lbs.......	0	3½	..	0	3½	Flawed and irregular	0	4½	..	0	0
55lbs. and under....	0	0	..	0	0						
Cows	0	2½	..	0	3	WOOL SKINS	4	0	..	7	3
Flawed and irregular	0	2½	..	0	2½	PELTS	0	8	..	1	1½
Horse each...........	0	0	..	0	0	LAMBS	0	5½	..	2	0
Bulls..................	0	0	..	0	3						

LEADENHALL LEATHER MARKET.

LONDON, SATURDAY, April 24.—Although the supplies of Leather on sale have been considerably on the increase, the demand for all kinds has ruled steady, at very full prices.

CROP HIDES.

ENGLISH.

lbs.	lbs.	d.	d.
28 to	35	14 to	15
36	40	14	15½
40	45	14	16
46	50	15	16½
50	55	16	18
55	60	17	19

BUTTS.

ENGLISH.

lbs.	lbs.	d.	d.
14	16	17	20
17	20	17	21
21	24	18	22
25	28	20	21
29	32	22	26
33	36	23	27

FOREIGN.

lbs.	lbs.	d.	d.
14	16	—	—
16	20	17	20
21	24	17	21
25	28	18	22
29	32	20	21
33	36	21	24
36	45	—	—
45	50	—	—

OFFAL.

	d.	d.
English Shoulders	13	17
Do. Cheeks and Faces	7	10
Do. Bellies	8	9½
Do. Middles	11	12
Foreign Shoulders	13	15
Do. Necks	10	12
Do. Bellies	7½	9½
Do. Middles do.	11	12
Dressing Hide Shoulders	10	12
D. do. Bellies	7	8
Kip Shoulders	5	8
Do. Bellies	5	6

DRESSING HIDES.

	lbs.	lbs.	d.	d.
Common	20 to	24	13 to	14½
Do.	25	28	13	14½
Do.	30	31	13	14½
Do.	35	40	14	15½
Saddlers	30	35	15	17
Do.	36	50	16	18
Bulls			12	14
Shaved	14	16	16	17
Do.	17	19	15	17
Do.	20	23	14½	16½
Do.	24	28	14	16
Scotch do.	16	24	14	17
Coach, per Hide			25s. to	30s.

HORSE BUTTS. SHAVED.

	d.	d.	d.	d.
English	13 to	14	15 to	17
Spanish	12	14	15	17

HORSE HIDES.

	lbs.	lbs.	d.	d
English	13 to	18	11 to	14
Do. without butts	9	14	11	14
			s. d.	s. d
Spanish salted, without butts, per hide.	6	9	11 0	13 6
Do. do. do.	9	11	12 0	14 6
Do. do. do. inferior			6 0	8 0
Do. dry do.	6	8	8 0	10 6
Do. do. do.	9	11	10 0	12 6
Do. do. do. inferior			5 0	7 0

CALF SKINS.

Av. weight. lbs.	lbs.	Unrounded. d.	d.	Rounded. d.	d.
20 to	28	14 to	17	16 to	21
30	35	14	17	16	22
35	40	15	18	16	23
40	45	15	18	17	24
45	50	15	18	17	24
50	55	15	17	17	23
55	60	15	17	17	22
60	70	15	17	16	21
70	80	15	16	18	20
80	90	14	16	16	20
90	160	13	16	15	19
100	120	13	15	14	18

KIPS.

	lbs.	lbs.	d.	d
Petersburgh	4 to	7	17 to	20
Do.	7	9	17	20
Do.	9	10	16	18
Do.	11	13	16	18
E.Ind.drysltd.	5	7	19	22
Do. do.	7	9	17	21
Do. seconds			15	18
Do. thirds			13	15
Do. inferior			9	12

SUNDRIES.

		s.	s.
Hog Skins, best	each	14 to	21
Do. seconds	,,	8	14
Seal Skins, split, per doz.		58	76
Do. for bindings	,,	36	80
Calf Skins, Sumach-tanned	,,	30	45
Do. white	,,	25	35
Horse Hides, white, each		8	13
Sheep Skins—		d.	d.
Basils, unstrained, per lb.		7	13½
Do. strained	,,	7	14
Do. facing, per doz.		5s.	16s
Tan, Sheep, & Lambs	,,	10	16
White Sheep, per 100		50	90
Do. Lambs,	,,	40	80
Do. Sheep & Lambs, strained, per doz.		5	14
Sumach Roans, per doz.		16	32
Do. Skivers,	,,	5	12
Bark Skivers,	,,	7	12
Hide Splits, per lb.		9 to	11d.

BARK, &c.

LONDON, SATURDAY, APRIL 24.

	£	s.	£	s.
English, per load of 45 cwt., del. in London	16	0 to	17	0
Coppice	16	0	18	0
Dutch, per ton	5	0	5	5
Hambro'	4	10	5	5
Antwerp Tree	5	0	6	10
Do. Coppice	5	10	7	0
Mimosa, Chopped	7	10	8	5
Do. Ground	8	0	10	0
Do. Long	5	0	6	0

	£	s.	£	s.
Cork Tree, Barbary	7	0	7	10
Do. Leghorn	6	0	7	0
Valonia, Smyrna, p. ton	12	0	14	0
Do. Camata	13	0	14	0
Do. Morea	9	0	11	0
Terra Japonica, Gambier	15	0	15	10
Terra Japonica, Cutch	38	0	40	0
Divi Divi	9	0	10	0
Myrabolams	7	0	10	0
Sumach, Sicily, p. cwt.	0	13	0	15

TIMBER.

LONDON, SATURDAY, April 24.—Our market is wholly devoid of animation; nevertheless, prices are somewhat firmer than last week.

Per load—	£	s.	£	s.
Quebec, red pine	3	5 to	4	10
Yel. Pine	3	10	4	0
Quebec Oak, White	6	0	6	5
,, Birch	4	0	4	15
,, Elm	4	10	5	10
Dantzic Oak	4	0	6	0
Memel Fir	3	10	4	5
Swedish	2	10	3	0
Masts, Qubc. Red Pine	6	0	6	10
Do. Yellow Pine	5	0	6	10
Lathwood, Dantzic fm	8	0	9	10
Do. Memel	10	0	11	0
Do. Quebec	5	0	5	5
DEALS, per C. 12 ft. by 3 by 9 in.:				
Quebec Wh. Spruce	9	0	11	5
Do. Red Pine	11	10	17	5
St. John Wh. Spruce	11	11	15	0

	£	s.	£	s.
DEALS, Yel. Pine, per reduced C.:				
Canada, 1st quality	15	0 to	16	0
Do. 2nd do.	10	0	11	0
Archangel Yellow	16	0	16	0
Memel	13	0	14	0
Gothenburg Yellow	13	0	14	0
Do. White	11	0	12	0
Gefle Yellow, 14 ft.	30	0	0	0
Christiania, per C. 12 ft. by 3 by 9 in.:				
Yellow	24	0	28	0
White	19	0	24	0
Deck Plank, Dantzic, per 40 ft. by 3 in.	1	0	1	10
Staves, per Standard M.:				
Quebec Pipe	75	0	0	0
Do. Puncheon	20	0	23	0
Baltic Crown Pipe	140	0	145	0

OIL MARKET.

OILS.

	£	s.	d.	£	s.	d.
Olive, Florence, half-chests	£0	18	0 to	£0	0	0
Lucca	6	0	0	8	0	0
Gallipoli (252 gals)	47	0	0	0	0	0
Spanish	43	0	0	46	0	0
Linseed (cwt.)	1	9	3	0	0	0
Rape, Pale	2	2	0	0	0	0
Brown	1	17	0	1	18	0
Cod (tun)	31	0	0	31	10	0
Seal, Pale	37	10	0	40	0	0
Do. Brown, Yel. &c	26	0	0	37	0	0
Sperm	79	0	0	83	0	0
Head Matter	85	0	0	86	0	0
Southern	38	0	0	38	10	0
Cocoa-nut (cwt.)	1	19	0	2	1	6
Palm	1	15	0	2	0	0

RESIN.

	£	s.	d.	£	s.	d.
Yellow (per cwt.)	£0	6	0	0	6	6
Transparent	0	6	0	0	6	6

PITCH.

	£	s.	d.	£	s.	d.
British (per cwt.)	£0	6	6	0	0	0
Archangel	0	0	0	0	0	0
Stockholm	0	10	0	0	0	0

TURPENTINE.

	£	s.	d.	£	s.	d.
Spirits (per cwt.)	£2	0	0	0	0	0
In Puncheons	2	1	0	0	0	0
Rough	0	11	0	0	8	0

TAR.

	£	s.	d.	£	s.	d.
American	£0	0	0	0	0	0
Archangel	0	0	0	0	16	0
Stockholm	0	0	0	0	15	0

WHALEBONE.

	£	s.	£	s.	d.
Greenland, full size (per ton).	£300	0	400	0	0
South Sea	260	0	270	0	0

AGRICULTURAL MEETINGS IN 1858.

MAY 22.—Royal Agricultural Society of England.—General Meeting, in Hanover Square, at 12 o'clock.

JUNE 2, 3, AND 4.—Bath and West of England Society.—Meeting at Cardiff. Entries closed. Secretary, Mr. St. John Maule, Pultney Street, Bath.

JUNE 8.—Glasgow Agricultural Society.—Meeting at Glasgow. Entries close May 27. Secretary, Mr. R. M'Cowan, Gordon Street, Glasgow.

JUNE 15.—Essex Agricultural Association.—Meeting at Chelmsford. Entries close June 1. Secretary, Mr. R. Emson, Slough House, Halstead.

JUNE 18.—Norfolk Agricultural Association.—Meeting at Norwich. Entries close May 29. Secretary, Mr. E. C. Bailey, Orford Street, Norwich.

JULY 7.—Suffolk Agricultural Association. Meeting at Bury St. Edmunds. Entries close June 1. Secretary, Mr. R. Bond, Kentwell, Long Melford.

JULY 20, 21, 22, AND 23.—Royal Agricultural Society of England.—Meeting at Chester. Entries for Implements close May 1; entries for Stock June 1. Secretary, Mr. J. Hudson, Hanover Square, London.

JULY 28.—Ryedale and Pickering Lyth Agricultural Society.—Meeting at Kirby Moorside. Entries close July 10. Secretary, Mr. J. H. Phillips, Beadham Grange, Helmsley, Yorkshire.

JULY 28 AND 29.—Lincolnshire Agricultural Society.—Meeting at Grantham. Entries close July 10. Secretary, Mr. J. Hett, Brigg.

AUGUST 4 AND 5.—Yorkshire Agricultural Society.—Meeting at Northallerton. Entries close July 21. Secretary, Mr. J. Hannam, Kirk Deighton, Wetherby.

AUGUST 10.—Northumberland Agricultural Society.—Meeting at Hexham. Secretary, Mr. W. Johnson, Trench Hall, Gateshead.

AUGUST 12 AND 13.—North East Agricultural Association of Ireland—Meeting at Belfast. Entries close July 1. Secretary, Mr. G. G. Bingham, Belfast.

AUGUST 18, 19, AND 20.—Royal Agricultural Improvement Society of Ireland.—Meeting at Londonderry. Entries close July 24. Secretary, Captain Croker, Upper Sackville Street, Dublin.

AUGUST .—North Lancashire Agricultural Society.—Meeting at Ulverston.

SEPTEMBER 1, 2, AND 3.—The Highland and Agricultural Society of Scotland.—Meeting at Aberdeen. Entries close July 16. Secretary, Mr. J. Hall Maxwell, Albyn Place, Edinburgh. (The Meetings of this Society are further arranged for Edinburgh, in 1859; Dumfries, 1860; and Perth, 1861.)

SEPTEMBER 10.—Manchester and Liverpool Agricultural Society.—Meeting at Manchester. Entries close August 30. Secretary, Mr. T. B. Ryder, Elliett Street, Liverpool.

SEPTEMBER 14 AND 15.—Sparkenhoe Farmers' Club.—Meeting at Tamworth. Entries close August 14. Secretary, Mr. Argyle, Tamworth.

SEPTEMBER 22.—Wayland Agricultural Society.—Meeting at Watton. Secretary, Mr. Woods, Merton, Watton.

SEPTEMBER 22 AND 23.—Staffordshire Agricultural Society.—Meeting at Lichfield. Entries close September 6. Secretary, Mr. W. Tomkinson, Newcastle.

OCTOBER .—Bedfordshire Agricultural Society.—Meeting at Biggleswade. Secretary, Mr. T. W. Turneley, Bedford.

OCTOBER 19.—Herefordshire Agricultural Society.—Meeting at Hereford. Secretary, Mr. Owen Fowler, Hereford.

NOVEMBER (not yet fixed, but most probably the week previous to the Smithfield Show) Birmingham Cattle and Poultry Show, at Birmingham. Secretary, Mr. J. Morgan, Jun., Bennett's Hill, Birmingham.

DECEMBER 7, 8, 9, AND 10.—Smithfield Club Cattle Show, at the Baker Street Bazaar, London. Entries close Nov. 1. Secretary, Mr. Brandreth Gibbs, Half-Moon Street, Piccadilly, London.

DECEMBER 6, 7, 8, 9, AND 10.—Various Meetings of the Royal Agricultural Society of England, of the Smithfield Club, and of the Farmers' Club, at their several Offices in London.

⁂ On the *first Monday* in every month up to June, and recommencing in November, there is a Discussion Meeting of the Central Farmers' Club, at 39, New Bridge-street, Blackfriars, at half-past five o'clock. On the *first Wednesday* in every month—excepting January, September, and October—there is a Council Meeting, confined to Members of Council and Governors of the Royal Agricultural Society, in Hanover-square, at twelve o'clock; and on *every other Wednesday* an open Meeting for all Members of the Society, at twelve o'clock.

[We shall continue the occasional insertion of this *List* throughout the year, and add to it as other Societies make their arrangements, of which we shall be obliged by early notice.]—EDITOR M. L. E.

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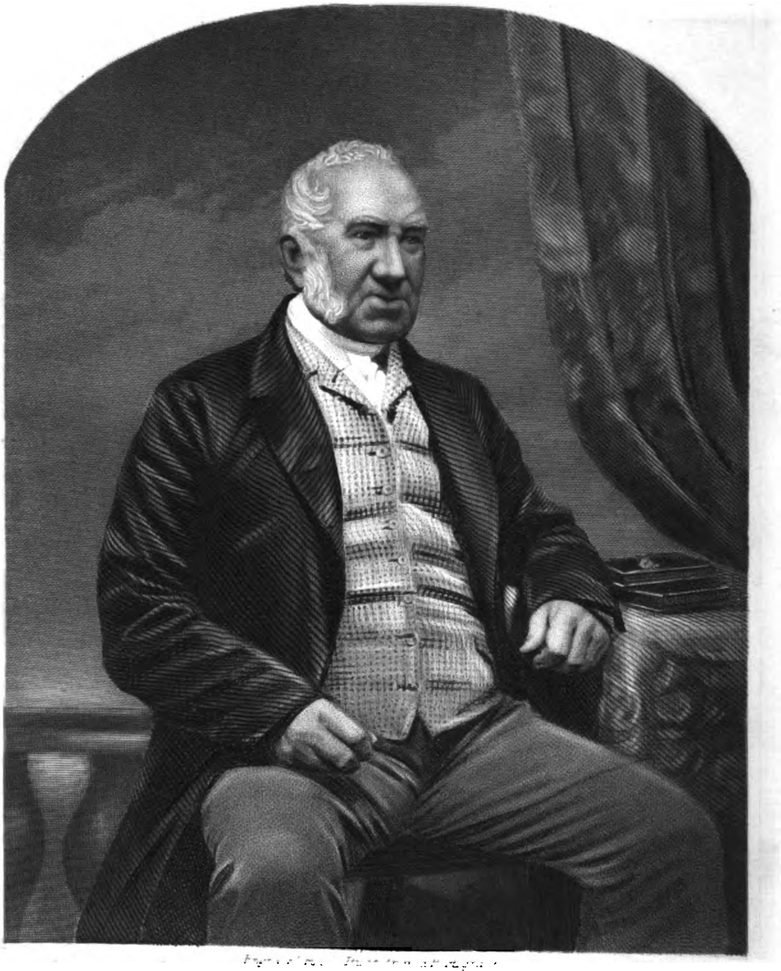

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Yours very truly
J J Farquharson

THE FARMER'S MAGAZINE.

JUNE, 1858.

PLATE I.

PORTRAIT OF J. J. FARQUHARSON, ESQ.

ENGRAVED BY J. B. HUNT, FROM A PHOTOGRAPH.

PLATE II.

A HEREFORD PRIZE OX.

THE PROPERTY OF MR. JOHN SHAW, OF HUNSBURY HILL, NORTHAMTON.

J. J. FARQUHARSON, ESQ.

This great Dorsetshire agriculturist and worthy country gentleman first saw the light on October 9th, 1784. Oxford claimed him in due course, and he passed his undergraduate days pleasantly enough, beneath the sound of "Mighty Tom" of Christ Church. Treadwell was but a lad of six, playing about among the hedgerows of Stoke Talmage, when his future master flung aside his Herodotus for his Somerville, and commenced at two-and-twenty, with a goodly band of whitecollars, as huntsman to his own pack. It was the English country squire at once taking to the business of his vocation.

Unlike many men, he did not begin with harriers, or a three or four-days-a-week pack, but boldly flung himself at once into the fox-hunting breach, and hunted, at his own expense, all Dorsetshire and part of Somersetshire six days a-week from the very outset, with thirty horses, two kennels, and ninety couple of hounds. Cranbourne Chase, with its short oaks and hazel trees, was then, as it is now (though it was rather short last season), the great nursery of Dorsetshire foxes; but its yellow-breasted martens, to whose memory English historians still continue to cling, as the latest relics of the vermin of feudal times, have all but disappeared, along with the badgers in Wychwood Forest.

In addition to his extensive agricultural pursuits, among which sheep-breeding is not the least, Mr. Farquharson has always been an enthusiastic breeder of horses, and his colours were once perpetually seen in front at the county races. The Hobgoblin strain, which goes through Annette back to Phantom, has been his choicest blood of late years, and it has crossed especially well with that of an Elis mare, who died about two years since, leaving two rare chesnuts—one of them Will-o'-the-Wisp—as her legacy to the stud. It is upon The Pony, who is by Cadiz, and quite as tender as a lover with hounds, that Treadwell will go down to posterity in Grant's picture, while his good master selected Botanist to honour.

It was no small sorrow to the white-collars and farmers of Dorsetshire that "The Squire" should have been prevented, by a severe horse-kick, from hunting with them the last five weeks of the season; and until he "pronounced the words of doom" at.

the farewell festival in February, they clung to the hope that the parting was not to be. We care not to dwell on this sad wrench and its causes. There have been heart-burnings enough, and the division of the country has indeed been purchased at a bitter price. Dorsetshire has not, however, failed to show its gratitude. In 1827 it presented its Squire, at a cost of eleven hundred and fifty guineas, with a vase and shield, as a meet acknowledgment of his chivalry; and thirty years later it celebrated his jubilee, by the presentation of two candelabra in the *renaissance* style. The picture, to which the greater portion of the £1800 then collected was devoted, was not finished till many months after, and then it merely came to grace the farewell banquet.

From none on this occasion did the cheers come more heartily, or was the expression of sympathy more manifest, than with the farmers of the county. It is, indeed, as a good landlord and excellent country gentleman that we here give our greeting to Mr. Farquharson. Although the chase may have been his first love, he has ever shown an innate and lasting inclination for agricultural pursuits. He farms himself still, we believe, between two and three thousand acres of land in the best possible style. The character of his flock has long been famous, and he ranks as a successful exhibitor at our agricultural meetings. He is of course a member of the Royal Agricultural Society, and with such-like support the cause will ever prosper.

PLATE II.

A HEREFORD PRIZE OX.

THE PROPERTY OF MR. JOHN SHAW, OF HUNSBURY HILL, NORTHAMPTON.

This capital beast was bred by Mr. Richard Shirley, of Bawcott, Munslow, Shropshire.

At the Leicestershire Agricultural Society's Show, in December, 1856, he took the first prize of 15 sovs.

At the Rugby and Dunchurch Show, in November, 1857, he took another first prize of 15 sovs., open to all England.

At the Birmingham and Midland Counties Show, December, 1857, he took the first prize of 10 sovs. as the best of his class, the extra prize of 20 sovs. as the best of all the Herefords, and the GOLD MEDAL as the best ox in the yard. Mr. Shirley also received a Silver Medal as his breeder.

At the Smithfield Club Show, the week following, he took the first prize of 25 sovs., Mr. Shirley having another Silver Medal. The ox was purchased here by Mr. Gutheridge, of High-street, Poplar.

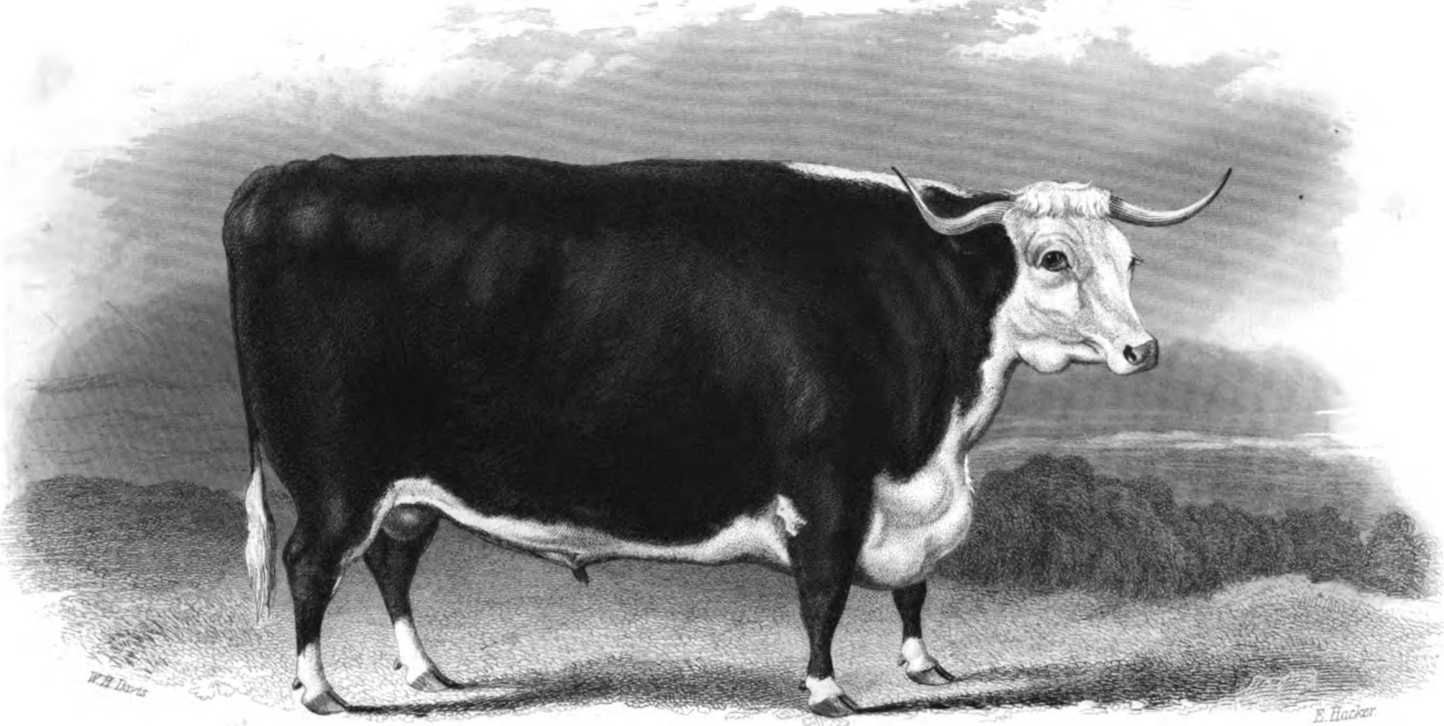
This was a magnificent beast, of immense length and depth, with all the good points of the Hereford beautifully developed. He had a wonderfully fine head, with good back and fore-quarter; was very heavy, and of excellent quality. Indeed, had it not been for a little dip in the back, he might have been passed as perfect. His feeder, Mr. Shaw, is a new man as an exhibitor, at least of cattle; his entries at the more important meetings having so far been confined to the sheep classes. It is needless to say this Hereford did every credit both to his judgment and management.

DRESSINGS FOR THE TURNIP CROP.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The different manures employed for the turnip crop are of annually increasing interest. Considerable public discussions have recently been held upon a theme so important to the stock farmer. When this paper comes before the agriculturist, turnip sowing will be about to commence in most portions of our island, and few are the farmers so happily situated as not to be benefited by the application of artificial dressings. At such a season, then, it will surely be attended with benefit if we inquire into the comparative merits of some of the manures which are urged upon the farmer's attention for the use of his root crops.

In the first place, then, let us refresh our memories by examining the mineral matters which the turnip crop requires for its healthy growth; what the perfect plant invariably contains; what it absorbs from, and gradually exhausts the soil of. This analysis was, some little time since, made by Way (*Jour. Roy. Ag. Soc.* vol. viii., p. 199.) He has



A Hereford Ox.

The Property of Mr. John Shaw of Ransbury Hall, Northampton for which the First Prize of £10, the Extra Prize of £5 as the best Hereford, and the gold Medal as the best of all the Oxen, were awarded at the Birmingham Cattle Show Dec. 1853.

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given the amount of mineral matter contained in one ton of the entire plants, bulbs and tops, of the common turnip. It is as follows:—

Silica	0·34
Phosphoric acid	1·77
Sulphuric acid	2·33
Lime	1·76
Magnesia	0·47
Peroxide of iron	0·07
Potash	6·07
Soda	1·46
Common salt	1·49

The amount of the mineral and organic matters of the turnip plant varies, however, in different seasons and climates. This fact has been to some extent ascertained by Professor Anderson and Mr. J. B. Lawes. The Professor examined the composition of turnips grown in the same season from the same seed, in Argyleshire and in Warwickshire (*Trans. High. Soc.*, 1856, p. 420); and although his trials are by no means conclusive in themselves, yet they well serve to indicate the importance of continued experiments. They illustrate, remarks the Professor, one of the great difficulties with which we have to contend in such inquiries, for we know nothing precise regarding the climate of these counties, further than that Argyleshire is characterized by the abundance of rain during the summer and autumn months, and by a low summer temperature; while Warwickshire has as favourable a climate as any English county. The turnips analyzed were swedes and yellows, both grown from the same seed in each locality, and treated in a precisely similar manner. The following were the results per cent.:—

SWEDES.

	Warwick.	Argyle.
Water	93.39	95.22
Ash	.50	.50
Protein compounds	.75	.44
Other constituents	5.36	3.84
	100.00	100.00
Nitrogen	.12	.07
Phosphates in the ash	.09	.06

YELLOW.

Water	94.11	95.35
Ash	.70	.72
Protein compounds	.62	.50
Other constituents	4.57	3.43
	100.00	100.00
Nitrogen	.10	.08
Phosphates in the ash	.09	.05

Comparing these analyses, adds the Professor, it is at once seen that the turnips grown in Warwickshire materially exceed in value those from Argyleshire. The swedes from Argyleshire contain 2 per cent. more water than the Warwickshire swedes; 10,000 parts of the Warwickshire swedes contain 661 parts of solid matters, while the same quantity of those from Argyle contain only 440. If we assume the amount of solid matters as the measure of the nutritive value of the two samples, then it would follow that two tons of the Warwickshire swedes must be equal to nearly three tons of the Argyleshire, and it is probable that this is not far from the truth.

The trials of Mr. Lawes were carried on in his usually extensive and elaborate manner, at Rothamsted, in Hertfordshire, and were chiefly directed to the question of the influence of the amount of rainfall, and the mean temperature of the turnip season, upon the produce of the crop. In his trials in the years 1844 and 1845, he obtained the following results:—

	1844.	1845.
The mean temperature from June to end of Oct.—turnip season	59.4	57.8
No. of days on which rain fell during this season	67	74
Inches of rain falling	10.37	9.62
Produce of bulbs per acre in tons and cwts.:		
Manured with 12 tons of farmyard dung	10 15	7 14
Do. with superphosphate of lime	7 14	12 13

As a general fact, it is evident, concludes Mr. Lawes, that the amount of the produce of the turnip is very materially dependent upon the climatic character of the season, not only as in itself a *resource*, but as an *essential agent* in the appropriative power of the plant, however liberal and complete may be the supply of constituents within the soil.

To promote the growth of the turnip crop by supplying its mineral and organic substances, two valuable manures—guano and superphosphate of lime—have been extensively used, and with very remarkable success. The employment of these powerful fertilizers, however, has been found to require considerable care in their application to the soil, and moreover that the result of the trial is materially influenced by different climates and soils. On the fine loamy barley lands of Surrey resting upon the chalk, a *mixture* of these two manures is commonly used—say, 1 cwt. of guano and 3 cwt. of superphosphate of lime per acre. This proportion of the superphosphate employed has been gradually increasing for the last two or three seasons. We have found, in fact, that in my neighbourhood better crops are thus produced, and moreover that the good effects of the superphosphate of lime, applied as a dressing to a root crop, are commonly very plainly discernible in the succeeding barley crop, and not unfrequently even in the third or clover crop. It is a common and a good practice with my neighbours, in Surrey, to drill these manures, either by separate coulters *below* the seed, or else (especially when the turnips are grown on the ridge) to mix them with a considerable proportion of dry ashes, and spread them on the soil before the last ploughing.

That a mixture of guano and superphosphate of lime is a far preferable dressing for turnips, than either of these valuable fertilizers applied alone, seems to have been the result of many careful trials made in other and widely different localities: take, for instance, two series of trials lately made in Scotland and in Ireland. In those in Scotland (*Quar. Jour. Ag.* 1857, p. 667), in one trial the whole field was manured with 20 tons of farm-yard compost per imperial acre, and then dressed with the following manures, at a cost of 26s. 6d. per acre. The results were, that on equal-sized ridges—

Dissolved bones and Peruvian guano	gave	6	tons	2	cwt.
Steamed bones and guano	„	6	„	3	„
Steamed bones and guano	„	6	„	1	„
Dissolved bones alone	„	6	„	7	„
Dissolved bones alone	„	5	„	17¾	„
Steamed bones alone	„	5	„	19	„
Leone guano alone	„	4	„	7	„
Leone and Peruvian guano	„	5	„	12	„

In another trial, at Borgue—

	Tons.	cwts.	
Peruvian guano, 5 cwt. per acre, produced of bulbs	20	12	per acre.
Bolivian ditto, 5 do.	19	15	„
Blood manure, 7½ do., do.	18	5	„
Dissolved bones, 7½ do., do.	17	15	„

In some experiments made by Mr. Templeton, at Clanboye, in Downshire (*Irish Farm. Gaz.*), with Skirving's purple-top swede, he found that the turnips from 24 tons of farm-yard manure per acre produced the greatest weight of bulbs per acre; those from 12 tons of manure and 2½ cwt of Peruvian guano the next greatest weight; those from 12 tons of manure and 12 bushels of crushed bones the next best; those from 5 cwt. of Peruvian guano the lowest weight of all.

It has been the practice with many farmers to mix the Peruvian guano with an equal weight of common salt: this would seem to be especially a useful addition to Peruvian guano, as a dressing for mangel wurzel, and for its after-effects on the barley crop.

It is, of course, of the first importance to procure the best Peruvian guano and superphosphate, and I would earnestly warn my readers to be very cautious in the use of any other. Professor Cameron, in his valuable work on "The Chemistry of Agriculture," p. 113, has given the analyses of several varieties of guano known in commerce. Let us only contrast the average composition of the Upper Peruvian guano, with that from the Kooria Mooria Islands, which last variety I fear is likely to prove of little average value :—

	Peruvian.	Kooria Mooria.
Water	10.00	18.10
Organic matter	21.68	12.41
Yielding ammonia	(4.50)	(2.05)
Earthy phosphates	51.50	42.67
Carbonate of lime	—	4.19
Alkaline salts	14.12	4.13
Sand, clay, and other useless matter	2.70	18.50

Of the adulterated (and of course always the *dearest*) guanoes, and their names and varieties are legion, Professor Cameron too truly tells us that the substances with which guano is adulterated are sand, clay, powdered bricks, marl, chalk, limestone, salt, &c., one or more of these being added to the guano, very commonly to the strong-smelling Ichaboe or damaged Peruvian, the proportion of course depending not only upon the conscience of the compounder, but on the presumed gullibility of the purchaser. So skilfully are these compounds prepared, that the most experienced buyers are often imposed upon, detection in very many cases being very difficult by any except chemical means. Several analyses of adulterated Peruvian guano were during the past month communicated by Professor Voelcker to the Royal Agricultural Society, see our present number, page 521.

The same systematic frauds are carried on in the adulteration of superphosphate of lime. In this case the matter added is very commonly finely-ground coprolites and some cheap salt, such as sulphate of soda or common salt. There is only one safe way of being secure from these robbers. Let the farmer deal only with those makers—and there are more than two or three such—who have been long-established, and whose characters are above suspicion. If the intending purchaser is still in doubt, let him ask the opinion of such men as Anthony Gibbs and Sons, Professors Way, Voelcker, Anderson, Wilson, &c. Let the reader submit to one of these gentlemen a list of makers, and ask him to put a mark to the names of those whom the marker knows to be trustworthy, and then he may purchase with comfort.

There is certainly a very general growing feeling in favour of superphosphate of lime as a dressing for turnips. The editor of the *Quarterly Journal of Agriculture*, from the result of Scotch experience, also inclines to this opinion. After observing (volume for 1858, p. 322) that for some years the Caledonian farmers have been profitably trusting to Peruvian guano, he adds, that it has been found, however, that the white crops on those fields on which there has been a recent and several applications of guano are soft in the straw, and do not yield according to bulk as well as they used to do. (This softness of straw, however, has in my experience been readily prevented by the addition to the guano of at least an equal bulk of common salt.) In Bavaria, we find from the same authority, the farmers, after using guano for some years, now find it necessary to apply it in larger quantities than formerly, in order to obtain the same results; and, from some calculations of the comparative cost of the production of turnips in Scotland, it resulted "that the average cost of a ton of turnips from guano in six distinct experiments, in different parts of the country, was 3s. 2¼d., while the cost of a ton from superphosphates (made by different manufacturers), in four districts, is 2s. 2¾d., the cost of the manure in both cases only being calculated; so that there is a difference of 11½d. per ton in favour of superphosphates; and as the average crop of the experiments was about 25 tons per acre, we have a profit of £1 4s. per acre by using superphosphates instead of guano.

The reason why the soil gets "tired" of certain crops and fertilizers is well worthy of still more extended examinations than it has yet received. The land "tires" we all know of clover. Many farmers will tell you that their soils are getting more and more tired of swedes, in spite, too, of all the artificial dressings which they so generously bestow upon them. Hence one reason amongst several why mangel is so increasingly cultivated. Let these little difficulties inspire us with fresh ardour for more careful researches. There is probably something extracted from the soil by particular plants, which, although of importance to the growth of the crop, is yet too minute to have been yet detected. Certain predatory insects, too (some, perchance, yet unknown to us, of a very minute yet pernicious character), follow all crops, gradually extending themselves to the farmer's loss, and no crop has been more subject to these than the turnip. In arriving, however, at such a conclusion, let us not forget that the cultivation of no crop has been more extensively aided by science. If the chemist had done nothing for agriculture than discovering the use of superphosphate of lime, he would even then have been well entitled to the cultivator's gratitude.

BARLEY.

In Scotland, there has not been the same attention bestowed in selecting and propagating new varieties of barley and bere as of wheat and of oats, nor has the introduction of varieties from other countries been generally successful. Hence, the kinds in cultivation are limited in number, and none of these are comparatively newly propagated varieties. To explain this apparent indifference on the part of the growers of barley is impossible. Perhaps the prevalence of the belief that barley is not generally so profitable a crop as wheat or oats, except where the soil and climate are highly suitable, may account in part for the apathy displayed. Whatever is the cause, the consequence is the cultivation of a restricted number of kinds of barley and bere.

Barley is cultivated mainly for the production of ales and alcohol; but a considerable quantity is manufactured into pot-barley, Ulm-barley, and a limited portion is ground into meal for bread, and also for feeding stock. The light and inferior samples are principally used for feeding horses, being generally prepared by boiling.

Barley was at one time in more general cultivation than at present. Up to the beginning of the present century, it occupied in part the place now occupied by wheat, being then grown extensively as a bread corn for the manufacturing of meal, besides being made into pot-barley, Ulm-barley, and for furnishing grain from which the extracts ales and alcohol were obtained. The bread from barley-meal was baked into scones — "supple scones"—resembling those made of wheaten flour. Sometimes mashed potatoes were mixed with the meal—rarely wheaten flour. This kind of bread was mainly confined to the western side of Scotland, but there oaten cakes formed the staple bread. Mashlam bread—a mixture of barley and legumes —was also in partial use over Scotland and the north of England; but in the south-eastern counties this was the principal bread of the working classes, barley being mixed with beans and peas—generally in the proportion of two bushels of the former to one of the latter. From this were baked what is usually known as gray bannocks. These were usually above one inch in thickness, and were seldom palatable to one unaccustomed to the bread, except when a little soda was used to render the bread lighter. On special occasions, such as Hansel Monday, and sometimes on the occurrence of an addition to the hind's family, a portion of wheat was substituted for the barley, in part or whole, along with the mixture of beans and peas—the legumes being generally grown as a mixture for a field crop. A taste for wheaten bread (white bread) became general in the family of the hinds about thirty years ago, but such an innovation was generally regarded as wasteful extravagance, and bakers' bread was rather covertly partaken of, until within the last few years.

The occurrence of low prices for wheat, simultaneous with the operation of a free tariff, rapidly extended the use of wheaten bread; which is now taking the place of gray-bannocks—wheat being substituted for barley in preparing the meal. From time immemorial, in the districts referred to, the wages (gains) of the hinds have been paid in kind — the bread corn being generally eighteen bushels of barley, and eight bushels of beans and peas; the oats, raised from forty-eight to sixty bushels about the beginning of the present century, being partly manufactured into meal for porridge, and partly sold. From the change in the habits of the people, it is a question for the employers and employed to consider whether it would not be a mutual advantage to both to substitute wheat in part or in whole for the barley.

With advancing agriculture, the period of sowing barley has become much earlier than formerly. During the first quarter of the present century, the sowing of barley seldom commenced before the last week of April, ending with the first week of June, Indeed, "bere seed time," as it was then called, was betwixt the Terms—15th to 26th May. In the south-eastern counties barley was usually taken after the turnip crop, especially where the land was not cleared of the turnips previous to winter. The period of sowing was usually the end of April. Barley thus occupied the second place in the rotation, this being a four, five, or six course. In the Carse districts where barley occupied the fourth place in the six-course rotation, the land received a spring fallowing—three spring furrows, with the necessary harrowing and rolling to pulverize the soil for the reception of the seed. Sowing proceeded during the month of May. With the extension of thorough draining the land is now earlier seeded over the whole of Scotland, although in backward districts, the practice of the beginning of the century is still followed. The general advance in the period of sowing is fully one month, in some districts about six weeks. A considerable breadth of barley is now grown after a cereal crop—wheat or oats. Manure is usually applied. When barley is taken after wheat, grass seeds—a mixture of ryegrass and clovers—are sometimes sown with the barley. By this practice the four-course rotation is rendered a five-course. Where barley is taken after the oat crop, portable manures are applied—generally Peruvian guano. Growing two white crops successionally is a partial return to the general practice of the last century, and is by many regarded as a breach of the rules of good husbandry. It must not be assumed from this, however, that the practice is not good husbandry, especially when the barley is taken after the oat crop, and is followed by a green crop. The facilities afforded for the maintaining fertility by the application of portable manures renders the practice judicious; especially as, by increasing the number of crops in the rotation, potatoes, turnips, and clovers can be grown with more uniform success, than where these are repeated at shorter intervals, and where partial failures have frequently occurred. Local position, soil, and climate are the principal elements in judging of the practice, which gives a larger money return, both for the value of the crops, and their being grown more healthy, while the fertility of the soil is maintained.

None of the kinds grown in Scotland are what are classed as winter barleys, although in many situations several varieties would survive during winter. An experiment with the Chevalier variety in East Lothian—sowing it in the month of October—has proved successful, the crop ripening nearly a month earlier than when sown in spring, and producing a very fine sample. The periods during which barley occupies the ground, vary with the variety, character of the soil, and season. The period of sowing now extends from the first of March to the first week in June—the latter being very exceptional. Period of reaping extends from the beginning of August up to the middle or even end of October. The more early kinds ripen about ten to fifteen days before the later kinds, but the sowing of the late varieties is confined to the months of March and April, so that the barley crop is usually reaped in the beginning of harvest.

The aggregate produce of barley has been greatly increased by the appliances of draining and portable manures. By the agency of these, barley is now grown on all kinds of soils where the climate is favourable, while on all soils the produce is much more uniform, and the average quality very much improved. Phosphatic manures act powerfully as fertilizers for the growth of barley, but nitrogenous manures exercise a power which is most striking. Nitrate of soda applied in small quantities greatly increases the produce of grain; but it is by the action of Peruvian guano, furnishing both nitrogen and phosphates, that the produce of this cereal can be most largely increased. Various estimates have been made as to the increase of produce which is due to the action of furrow-draining, and to the fertilizing agency of portable manures. The increase from furrow-draining has been estimated at one quarter per acre, and from the use of portable manures from four to six bushels. The increase from the two agencies combined cannot be estimated at less than ten bushels per acre. The introduction of Chevalier barley has also increased the aggregate produce. In East Lothian, for instance, where the three causes are in operation, the acreable produce is upwards of 40 bushels; and on some farms, the produce of which we have an opportunity of knowing, from records carefully kept, and which embrace a considerable period, the average acreable produce of barley has increased sixteen bushels per Scotch acre within the last twenty years.

At one time great attention was bestowed on the changing of seed, particularly from the coast to the interior. Ware barley—that is, barley raised on farms where seaweed was applied, always commanded a high price in spring. Barley raised on Carse soils was also in demand for seed. In upland districts, the crop was often injured from frost, consequently was unsuitable for seed; but there appear to have been other influencing causes which led to this general belief. The desire to secure a change of seed is not now general; indeed, in some districts, is almost in abeyance. That there are well-ascertained facts as to the beneficial effects of a change of seed is undoubted; but where the condition of the land is maintained, and the crops properly ripened, the necessity of a change of seed may be doubted. On one farm in Mid-Lothian, the same barley has been raised without change for forty years, and in favourable seasons this grain has reached the extreme weight of 60 lbs. per bushel.

Common bere or bigg is now cultivated chiefly in the Highlands and Western Islands: also to a limited extent in upland districts, where the situation or soil is unsuitable for the growth of common barley. On light and peaty soils bere succeeds better than barley, being less injured by lodging. It is generally taken after a potato crop, or on peaty soils recently reclaimed, following the green crop which succeeds the oat crops.

The cultivation of bere is being gradually more and more resticted, chiefly from the lower price at which it sells, compared with barley of equal weight. At one time bere was in much more general culture; even in the best parishes in the Lothians, rents payable in kind, and the stipends of the clergy, were payable in bere. It was usually considered that land somewhat out of condition for barley produced a more certain crop of bere. From the terms barley and bere being frequently used synonymously, there is considerable difficulty in following writers of the last century as to what was the kind of grain referred to.

The kinds generally grown in Scotland are what are usually termed "common bere"—straw seldom over 3 feet in length; colour, when ripe, a buff yellow—ear about 2 inches long—the grains clustering, uniform and closely set—the length of awns about two to three inches, these bristling outwards, and adhering with consideable force to the grain. The grains are pointed and taper towards the ends. This distingushes bere from common barley. The colour of the grain is a dingy brown—weight seldom 54 lbs. the bushel; more frequently from 40 to 51 lbs. Produce varies much—from 3 up to 8 qrs. per acre, but is, on certain soils, more uniform in yield than commonly barley, and ripens from four to ten days earlier.

Victoria bere is a selected variety, larger and stiffer in the straw; the yield is stated also to be greater. This variety is coming into more general favour.

Peruvian barley is a bere—colour of grain black or dark blue--grains larger than the common barley, and clustering like common bere—awns long and dark coloured, adhering to the grain; length of straw ranges from 3 to 4 feet. When sown early, and on rich soils, this variety is prolific, nearly equalling that of Chevalier barley. But there exists a strong prejudice against it, both by millers and maltsters, from the colour of the grain. The name Peruvian indicates that it was imported from Peru; but it is similar in character to the black winter barley of the continent, and may be regarded as identical. Beyond experiments, this variety has never found a place, and is now all but neglected.

Common Scotch barley has been cultivated from time immemorial. It seems to be identical with common English barley. There appear to be several kinds, some being more prolific than others. These sub-varieties are probably in part the result of selection, but more generally of continued cultivation on fertile soils. One of the best of these is Bell's. Other names are in use—Stirlingshire, &c. The straw of the common barley is generally about 3½ feet in length, small in the pen, leaf narrow, deficient in strength, and liable to lodge—especially on soils in high condition, with an excess of carbonaceous matter. The grain is two-rowed; the number of grains in the ear generally under twenty-eight; awns extend about 3 inches; when well ripened, readily parts with the awns; the grain is less pointed than bere; colour a buff yellow; in very dry seasons, the colour has a tendency to a bright golden tinge. Weight of grain from 50 to 56 lbs. the bushel; average about 53 lbs. Produce is very unequal, being more influenced by the character of the season than any other variety; average produce 3½ qrs.—extreme produce 7 qrs. It occupies a greater breadth than any of the other varieties, mainly from its earliness, and also from its admitting more air to the soil—thus fostering the growth of grass seeds—these being usually sown with the barley crop. In the best-farmed districts, however, common barley, from its softness of straw—thus being more liable to lodge from wet during the period of growth, and, from sprouting much more rapidly when the grain is in the stook—has generally given place to Chevalier with its sub-varieties. The weight of straw per acre seldom exceeds a ton and a-half per acre—average little over one ton.

Chevalier takes the name from the propagator, a gentleman in the south of England; introduced into Scotland about 1835, and rapidly came into general favour. Experiments undertaken at its introduction into East Lothian usually gave an increase of produce over common barley of 6 to 8 bushels per acre, with an increased weight of grain per bushel of from 1 to 2 lbs. On some farms where the situation is not so favourable for the growth of barley, it is stated that the yield does not exceed that of common barley. Chevalier is generally of a luxuriant growth; straw about 4 feet in length, pen of greater diameter and stoutness than the common barley, leaf broader. Weight of straw sometimes exceeds two tons per acre—average weight about one and a-half tons; readily eaten by stock, particularly by horses. The ears resemble common barley. Number of grains generally under thirty; grain rounder and more plump. Sample otherwise generally superior to common barley, especially when the grain has been early sown, and the season favourable. Period of ripening from eight to ten days behind common barley, and therefore generally sown in March, or latest by the middle of April. Weight of grain from 53 to 58 lbs. per bushel; 60 lbs. have been grown, but this is very exceptional. In the best barley districts of Scotland the average weight, when well dressed, varies from 54 to 57lbs. Produce per acre from three and a-half quarters up to nine quarter—in one or two cases this latter quantity has been exceeded. The produce is more uniform than common barley, besides being larger. The variety is not suitable for late and exposed districts, the ears being liable to break off during storms in harvest; when the crop is allowed to become too ripe, the stalk is bent close to the ear, and the weight of the ear occasionally breaks the straw. There also exists a prejudice, especially in Carse districts, where there is a tendency to a luxuriant tillering and growth in the straw, that the closeness of the crop injures the braird of grass seeds. In the Lothians, however, it is preferred, on account of the stiffness of straw, rendering it less liable to lodge, and thus destroy the grass seeds. It also withstands a wet harvest better then the other varieties; besides, the straw of the Chevalier is very superior. A common error on high-farmed land where grass seeds are sown is the allowing of too much seed. The quantity should not exceed, for broadcast, nine pecks per acre. Next to common barley, Chevalier occupies the largest breadth, and is gradually extending from the best-cultivated districts into the most backward.

Annat barley—selected in Perthsire in 1830 by the late Mr. A. Gorrie. The straw is about the same length and strength as the Chevalier, with a tendency to a purple tinge, particularly at the joints; grain, round and plump, like the Chevalier—of a bright yellow colour. The weight of bushel, with produce, similar to those of the Chevalier. Some growers have found this variety more delicate than the Chevalier, and abandoned its cultivation on this account. Annat barley occupies the third place.

Western barley—evidently a variety of the Chevalier, introduced into East-Lothian shortly after the Chevalier. It is now little cultivated.

Italian barley.—The straw long and of a bright golden colour; ears shorter than the Chevalier, with the grains more compact and pointed outwards. This, also a two-rowed variety, yields a large plump grain of a bright light yellow colour. It is somewhat later than the Chevalier; its cultivation has not extended, and is now much restricted; it is generally known by the term "golden barley." It does not succeed well in cold wet seasons.

Silesian barley.—A variety introduced into Leith from Silesia about 18 years ago; is in partial cultivation in the neighbourhood of Edinburgh: straw shorter than the Chevalier, bearing a close resemblance to common Scotch barley, the weight per bushel rather exceeding that of common barley; grain somewhat long in form; colour a dark shade of yellow. It is stated to be prolific, and better adapted for late districts than the Chevalier. It has been successfully grown at 800 or 900 feet above the level of the sea, and yielded 8 qrs. per acre, of good weight.

Saale barley—Introduced 18 years ago. A beautiful clear-skinned, small-grained variety; did not generally answer expectation; but occasionally fair crops have been raised.

Lincoln barley.—Introduced about 30 years ago; was found to produce long straw, with a fine-formed ear; period of ripening, about fourteen days behind common barley; its cultivation was dropped mainly from lateness of ripening. The quality of the grain also appeared to deteriorate when grown in Scotland.

Norfolk barley.—A variety of English called white Norfolk was very much grown in some parts of the Lothians before the introduction of Chevalier; by continued cultivation it lost its distinguishing characteristics, and latterly it did not push the ear fully out of the shot-blade. It was in request with the maltsters when first introduced.

Naked barley has been experimented with; but from the general dislike to this variety by maltsters, it is now seldom met with. Two varieties have been experimented with—one termed Siberian, the other Nepaul. Both appear to be the same variety, and stated to be in cultivation in the Himalayas, where sometimes two crops are grown in a season.—North British Agriculturist.

THE ADVANTAGE OF AUTUMN CULTIVATION FOR ROOT CROPS.

WINFRITH FARMERS' CLUB.

The monthly meeting of the members of this club was held at the Bear Inn, Wool, on the last Wednesday in March, the subject being "Autumn Cleaning of Stubbles."

Mr. **Darby**, of Lytchett, said he thought the subject which he had the honour of introducing to to their notice that evening was of the very greatest importance. They all knew very well that good and proper cultivation of the land ranked the very highest, and always had ranked the highest, of all agricultural questions. In fact, the ancient writers told them how high it was in the estimation of the Romans. When one of them was asked what was the first principle in farming, he replied, "Arare"—that is, to plough; and when asked what was the second, his answer was the same, "Arare." Dr. Lyon Playfair, in his admirable essay on cultivation, in "Morton's Encyclopædia," placed in a like prominent position the proper working of the land. He states that the main conditions of cultivation required to be fulfilled are—first, a thorough pulverization and drainage of the soil; second, a progressive chemical disintegration or liberation of insoluble ingredients; and third, a renewal, by means of manure, of those substances which have been removed from the soil by successive crops. They would perceive that he placed good manuring last, after good cultivation. They all knew, however, that it was necessary for both to go hand in hand; but in a great variety of soils, especially the richest, good cultivation ranked higher than good manuring. Now, the question under consideration was not, as it would appear at the first glance, confined to the cultivation of one single crop. They all knew that it was to the root crop they looked for that primary cultivation, that foundation of good farming, which was to follow throughout the rotation. The root crop was, in other words, the cultivation crop; and the success or otherwise of the whole rotation depended upon whether the root crop was put in well or ill—whether the work was carried out early, and clean cultivation proceeded with, so that the crop might be put in properly, or whether a contrary course was pursued. Thus it would be seen that it was the question of cultivation, as a whole, that they had to consider. Now, they all very well knew what the old system of preparing for root crops had been, in times past. Far too generally the stubbles were neglected until the wheat sowing was finished, unless it happened to be very wet; and when the land was not fit for the horses to go upon it, they were sent in to "poach," tread it down, and plough. Then in the month of February it was customary to cross-plough, and work the land as they could in the spring; and they all knew that they could not work when they would, at that season of the year. But after a variety of cross-ploughing, scarifying, and harrowing, the work was carried on somehow or other so as to get the crop in during the month of May, or perhaps not until June or even July. Mr. Pusey, in the Royal Agricultural Society's Journal, gave a description of the old system in much better terms than he could:

"The usual method has been to let the sheep range over the grassy stubbles in autumn, and give the land a winter ploughing towards Christmas. In dry, spring weather it is again ploughed to bring the couch uppermost, drag-harrowed with three or four horses to break the furrows, scarified with four or five horses to bring up the long roots, heavy rolled with three or four to squeeze the clods, light harrowed, light rolled again, light harrowed again, then all the hands turn out with rakes to gather this unravelled network, heap it, and burn it. But if the ground be really foul you have not done yet. After a few days you see fresh blades of grass shooting up over the bare ground, and find the enemy still left behind, so that the ploughing, harrowing, rolling, raking, and burning must begin over again—very likely be repeated a third time."

Mr. Darby observed he did not mean to say that a few years since it was as bad as this in every case; but still on heavy soils it was a very fair description of what the old method used to be. Now, this system had many disadvantages. As he had said before, if the stubbles were ploughed when too wet, they were "poached," and the surface did not present that presence to atmospheric agency which they all liked to have throughout the winter, so that the atmospheric air could get in and disintegrate the particles of the soil. Then again, from the uncertainty of the weather in spring, the after-culture was hurried in a manner it ought not to be, and this was a very great disadvantage in the old method of treating stubbles. From the same cause the crop was often put in very badly, and the land not properly cleaned; then they found couch grass spring up among the turnips, which was never got rid of, and the land got fouler and fouler, until it came to turnips again. The sowing was likewise often thrown backward, and the crop endangered altogether. Another great disadvantage was that the weeds were left in the soil throughout the winter, where they grew, and robbed the land of that ammonia which ought to be stored up for the future crops. It was now an acknowledged axiom that if the land be properly cultivated, it gets throughout the winter from 2 cwt. to 3 cwt. of ammonia from the atmosphere. Then another serious disadvantage of the old method was, that it very often interfered with the sowing of other crops. He now came to the question of expense. It had been proved by all who had tried the two systems that the old way of treating the soil was a very expensive one (Hear, hear). Mr. Pusey, in the article which he had quoted, gave an estimate of the expense of the operations under the old system at £2 9s. 6d. per acre; but although this was stated to be on heavy land, he (Mr. Darby) thought it a rather exaggerated estimate. He thought few of them who had tried the old way of treating stubbles would consider they had ever expended much above £2 per acre. But that was a great expense to incur in the prepararation of land for turnips; and he should suppose that the cost of autumn cleaning would not be above £1 or £1 5s. per acre at the outside. Well, these disadvantages had in many cases led to gradual improvement. Years ago they were felt so much that many excellent farmers wrote on the subject, and endeavoured to prove that stubbles ought to be ploughed as soon after harvest as possible; but still after ploughing they allowed the land to remain all the winter just as it was before, and although it presented a better surface to the atmosphere, yet there were the same objections to be made to the after-culture in spring. He now came to the new system of autumn cultivation for root crops. Most of them knew what it was; but still, in order to make the opening of the subject more complete, he supposed a short description would be necessary. The modern system was to go over the stubbles, where foul, with some cultivator, either Bentall's or Coleman's, as soon after harvest as possible: some farmers who were willing to go "the whole hog" had actually performed this work while the corn was on the land. They had cut the corn, put it in "stetches," raked the hand, and commenced this work of scarifying before the crop was carried. Few of those present, however, commenced quite so early as that; but the argument in favour of the plan was, that while the fine weather lasted they ought to take every fine day they could to perform this work, and it was stated that when cutting corn there were generally some horses thrown out of work which ought to be thus employed. But although it might not be convenient for all of them to do this, the general practice was that it should be done as early as possible in September. Of course the expense of this new system depended upon the foulness of the land, and whether it was of a light or heavy character. Sometimes merely going over it once would be sufficient, following after with the harrows, then raking it up, and burning it. Indeed, some farmers were in the habit of first going with men to fork out the couch where it is not very foul, and afterwards merely giving the land a little surface scratching; it all depended upon the state of the stubbles. But to lay down a rule, of course the new system meant that all the surface should be cleaned, and the land worked as early as possible in the autumn. Mr. John Grey, in a discussion on weeds at the Hexham Club, said:—

"He began, as soon as the crop was stored, or as soon as possible, with skim-ploughing the surface, harrowing and raking it together, and carting it off, putting it into the fold-yard to be the nucleus of the manure heap for next year. He then gave the land a deep ploughing, harrowed it, and put it into drills ready for the manure: when the manure was put in he reversed the drills, and so it lay, and nearly one-half of his turnip land was now in that condition, drilled, manured, and exposed to all the changes of the atmosphere during the winter. It came to be found in a mellow condition in the spring, and the turnips were sown upon this; whereas, if the land required to be worked up in a damp state, he could not make turnips of it at all: and for the few years he had practised this he had never failed in finding that the turnips sown upon that portion of the land came quickest into leaf, and overcame in the shortest period that great difficulty of rearing a good crop of turnips—that of coming quickly to the hoe. He ascribed it to this reason: the land upon the top of the drill was exceedingly mellow and fine; the manure had been undergoing not the fermentation which it got when thrown into great heaps, where it dispersed its ammonia into the air, and wasted much of its best virtues, but it underwent the slow and quiet process of fermentation throughout the winter, covered up with soil; and they found in the spring all the soil contiguous to the manure in a soft and brown condition, having inhaled much of the virtue which the manure had given off."

It would be perceived that Mr. Grey not only cleaned his land, but actually manured it in the autumn, thus preparing it in every way. After the land had been cleaned, he (Mr. Darby) thought it was advisable, from his own little experience, to allow it to remain two or three weeks, in order that the seeds of annuals, such as charlock, should spring up and vegetate; and then they ought to give the land a very deep ploughing. He was aware that many objected to this deep ploughing, and merely applied the cleaning system after; but he did not think the work was complete on the generality of soils without deep ploughing. As soon as the land was rid of all surface-roots and weeds, and after there had been time for the annuals to spring up, he gave the land a deep ploughing, and then allowed it to remain for the atmosphere to act upon it. Perhaps upon some light soils it was not so desirable to follow the deep ploughing, but even here it did no harm. In fact, the report of experiments in deep ploughing, which obtained a gold medal premium, and appears in the *Farmer's Magazine*, gave reasons to show that deep ploughing even on light land was beneficial; and the writer stated that in an experiment which had been made, the turnip crop showed an excess of 4 tons 13 cwt. 3 qrs. and 21 lbs. where the land had been trench-ploughed, over where it had been shallowed-ploughed. He summed up the whole question with these practical deductions:—

First: That deep ploughing increases the produce of both green and grain crops; and this the reporter states not only from what these experiments point to, but from having grown green crops, after trench-ploughing, on 180 acres, and grain crops on 135 acres of land, with uniform success.

Second: That trench-ploughing tendings to firm or consolidate light land. This is stated from the fact, that on walking across the stubble-field the writer felt the shallow-ploughed land more loose than the trench-ploughed land; and this is also supported by the fact already stated, viz., that the crop on the shallow-ploughed land had a greater lean-over than the other, while the quantity of grain was less; showing that, however forced, it is impossible on weak light land to grow very large crops without deep cultivation, as the mechanical texture of the surface cannot support beyond a certain quantity. Mr. Darby continued to observe that in the aggregate of soils they might say there was nothing like deep cultivation in autumn, if the weather was dry and the surface well cleaned. Now they were in a position to consider the advantages of the new system. All the disadvantages of the old system were done away with by the autumn-cleaning of the stubbles; the soil was exposed to the action of the frosts during winter, the couch and other weeds were removed, and all that came into the soil was reserved there as a store for future crops, and the danger of late cropping was avoided. When the land was thus ploughed up, it merely required the scarifying across it in the month of March to kill the annuals and other weeds that had grown upon the surface, and it would be fit for the crop to be put in. Then the injury done to the land by "poaching" and pulling it about when it was in an unfit state was entirely obviated. Another important point was the fact that the expense was materially lightened when the system was followed up from year to year; the stubbles got so clean that they scarcely wanted any scarifying after harvest at all. Instead of this, many farmers in Norfolk were in the habit of sending out their men, and they could actually fork out the couch grass for 1s. per acre. This showed how clean the stubbles were likely to become when the system was carried out for any length of time. One of the primary advantages of following the autumnal cultivation was, that the land was left in a most favourable state during the winter for the mechanical action of the atmosphere, and when they wanted to go to it in spring they found it in a beautiful "tilth," Nature having done for them what they could not have done half so well themselves. Also, when the land had been cultivated in this way, it took from the atmosphere a great quantity of manure. It was quite a new discovery that the soil did actually take manure from the air; and it was asserted that the quantity of carbonate of ammonia which fell from the atmosphere and entered into the soil was equal to 2 cwt. of guano, when the land was in a fit state to receive it; but when it was not, it did not enter into the soil, or was fed on by the weeds. Some chemists maintained that it did not come from the carbonate of ammonia in the atmosphere, but from the air itself, which had an inexhaustible quantity of nitrogen in its composition, being as much as four-fifths of the whole; and they said that when the crude matters in the soil were turned up, and the air allowed to enter into the interstices, the latter was actually decomposed, the oxygen flying off and the nitrogen being preserved; so that if this be the case, there was no limit to the quantity of ammonia that might be drawn from the atmosphere in the shape of nitrogen, if the proper conditions were carried out. Professor Balfour, in his "Manual of Botany," says—

"Mielder maintains that the ammonia is not carried down from the atmosphere, but is produced in the soil by the combination between the nitrogen of the air and the hydrogen of decomposing matters. The same thing takes place as in the natural saltpetre caverns of Ceylon, with the exception that by the subsequent action of oxygen, ulmic, humic, geic, apocrenic, and crenic acids are formed, instead of nitric acid. These acids consists of carbon, oxygen, and hydrogen, in different proportions; and they form soluble salts with ammonia. By all porous substances, like the soil, ammonia is produced, provided they be moist and filled with atmospheric air, and are exposed to a certain temperature. It is thus, he states, that moist charcoal and humic become impregnated with ammonia."

Mr. Darby said he had never seen this view very prominently brought before the public. English chemists, in giving reasons why the land did take so very much from the atmosphere, were, he thought, too ready to fall back upon the old theory, that there was a little carbonate of ammonia in the air, which was washed down by the rain. But it appeared to him that the former theory was the correct one. They all knew that the air was filled with manure—at least, with nitrogen; and it had now been proved by the Rev. Mr. Smith, who followed the Lois Weedon system, that land of the character he farmed might be kept in good condition, and grow corn crops without the addition of a particle of manure. During an experience of twelve years Mr. Smith had found his crops progress rather than retrogress. The system had been tried at other places, but had not answered so well as on Mr. Smith's farm; but it was considered to be satisfactorily proved that, if the land was prepared in a certain manner, it would get a large quantity of manure from the ammonia in the atmosphere. Professor Way had paid great attention to the capability of certain soils to attract and retain ammonia, and he had discovered that this varied according to the nature of the soil. In numerous and varied experiments Professor Way has shown that, where a comparatively weak solution of caustic ammonia is passed through a considerable quantity of soil, it invariably loses the ammonia, although previous to filtration it exhibited decidedly the peculiar odour of that volatile alkali. When, however, stronger solutions of ammonia were filtered through soil, or when the proportion of the latter was greatly diminished, only a portion of the ammonia was absorbed, and the remainder passed through the soil with the water. Still more important than the facts respecting the rapid absorption of free alkalies by soils, is the observation made by the same indefatigable philosopher—that all cultivated soils possess likewise the power of separating the ammonia from its combinations with various acids. If, for instance, a solution of sulphate of ammonia of moderate strength is passed through a filter-bed of soil five to eight inches deep, it will be found that the ammonia alone of the sulphate of ammonia is retained, and the sulphuric acid with which the volatile alkali is combined will then be found passing through with the water—generally, though not always, in combination with lime. 1,000 grains of a light red soil from Mr. Pusey's estate absorbed 1,570 grains of ammonia, 1,000 grains from the Dorset Downs absorbed 3,438 grains, 1,000 grains from the white plastic clay absorbed 2,847 grains, 1,000 grains of subsoil clay, red with oxide of iron, absorbed 818 grains. Mr. Darby continued to observe that they found, from Professor Way's experiments, that the capabilities of different soils to absorb ammonia were very different, and this would account for the advantages Mr. Smith derived from the Lois Weedon system, it not having been experienced in other cases. There was yet another advantage arising from autumn cultivation. Many, he supposed all of them, were to a certain extent in the habit of sowing spring feed for sheep, such as rye or early vetches. When this was done, it would be very much better to sow the rye or vetches into barley lands where the stubble had been cleaned than where they were foul. Then, if the land was cleaned in this way, it was not impracticable to have a seed-bed of plants, such as cabbage or kohl-rabi, or even rape plants, to plant out in the early part of September, after the land had been surface-rid in the manner described. He recollected an instance, when he was a boy, in Somersetshire, of a farmer, who was rather more enterprizing than his neighbours, growing rape plants on one side of a field, and as he cut the corn he ploughed the land and put the rape plants in the furrows, and he had a very excellent crop. It had been observed by Mr. Phippard, at their annual meeting, that it was the custom in some places to sow stubble turnips. Now, if they were to sow kohl-rabi, or cabbage, or rape plants, it was not impracticable on a small scale to have a nice bit of feed for the month of May, where they had had a good corn crop cut in August. In fact, when they got in the habit of adopting and carrying out this system, it would create quite a revolution in agriculture, and they might be led to follow the Belgian plan of raising plants in seed-beds, and planting them out after the corn had been harvested. There were many obstacles in the way of its adoption on a larger scale, as autumn cultivation on extensive farms required a great deal of horse-strength, and it was not every one who had the power to carry it out as he could wish. The fine weather was very short, and when they thought they were going to clean and work well, the wet weather might come on, and they could not do half what they intended. This had induced some gentlemen to commence before the corn was carted off the land; and it was worth while considering whether or not it was practicable to do so. But they all knew very well that in harvest time it was very busy work, and if they wished to do it they had to attend to the primary thing first—namely, cutting and harvesting the corn. Probably, however, before many years there would be a remedy for this in the steam plough, which was being brought to such perfection that they might anticipate seeing it in operation upon most of our large farms before long, and then there would be no difficulty in carrying out the system of autumnal cleaning of the stubbles during the fine weather. However, the experience of the Norfolk gentlemen, to whom he had alluded, showed that the main obstacles had only to be encountered at the commencement of the system, and that, after a time, it was far less difficult to do the work (Hear, hear). It had often been said that agriculture, to become perfect, must approximate to garden culture; and what could tend to raise it to that pitch more than the adoption of the system which, as soon as the corn is removed, rids the land of weeds, and prepares it to be a store-house of the fertilizing principles obtained through the atmospheric agency for the use of succeeding crops? In his opinion nothing was calculated to produce that desideratum, the causing of agriculture to approach to garden culture, more than this system, if deep cultivation be carried out with it. There was another question, which was that of late they had found it quite essential to pay more attention than hitherto to the cultivation of the turnip crops. It was quite certain that turnips were more difficult to grow than had been the case, and some Cassandras amongst them had predicted that the turnip crop would fail in the same manner as the potatoes had. That formed an additional reason why they should pay more attention to their culture, and hasten on the work in the early part of the autumn; for all allowed that when done in dry weather the land really got into a better state, and that there was more chance of a good crop being realized than by the old system (Hear, hear). Then again, owing to the frequent failures in the turnip crops of late, the generality of farmers were turning attention to the mangold crops; and where this was done, it was quite necessary autumn cultivation should be carried out. Mangold required to be put in much earlier than turnips; and on large farms, and small ones also, it was difficult, if not impossible, to cultivate them without pursuing the new system. Therefore the aspect of the times was, as it were, forcing them to adopt autumnal cultivation for root crops. He was satisfied that the more this system was carried out, the more certain would root culture become—they would make more sure of their crops, and get a larger weight per acre; in consequence of that, a larger number of sheep and cattle would be kept on the land; and it would tend to the almost total eradication of couch-grass and other weeds. Thus by fostering clean and good cultivation the system of autumnal cultivation would tend more than anything else to accelerate agricultural progress.

Mr. **Randall**, after complimenting Mr. Darby on the able manner in which he had introduced the subject, said he should like to know whether he considered ploughing-in the stubble was any advantage to the land. The new system that had been recommended was to rake the stubble together and take it off. Now, for his own part he was of opinion that the stubble was of great advantage to mix up with the soil. This year he had been trying a somewhat new system: he had raftered over the stubble, then used a Bentall, and afterwards ploughed it down. He believed it would be rotted in the soil, which would be benefited thereby.

Mr. **Longman** thought it would do very well where the land was clean.

Mr. **Saunders** quite agreed with Mr. Darby that autumn cleaning was the foundation of good farming. In the first place it allowed them to have a green crop for sheep in the following spring, whereas otherwise they would have nothing but fallow to work upon at that season of the year. Many of them, however, drove out the autumn cleaning too late; and he thought there should be paid quite as much attention to this as to harvesting. He certainly had never gone "the whole hog" and got between the "stetches," neither had he got so close after them as he ought to have done. He endeavoured to cut and carry his foulest piece first, where he thought it required considerable autumn cleaning, and then go in with oxen directly afterwards. He had got two of Bentall's because the season would scarcely allow him to do sufficient work with one. For autumn cleaning the corn ought to be cut as close as possible, because where there was so much stubble it was more difficult to work and get the couch out. He quite coincided with Mr. Darby that it would not cost half so much to keep a farm clean as to keep it foul. He worked the Bentall as soon after harvest as possible, dressed the land about till the weeds, &c., were dead, and then ploughed it down; and it did not require ploughing but once afterwards, if the land was in a tolerably clean state. He did not think it advisable to let it stay about till the seeds of the annuals came up, as it was in the fall of the year that they shed their seeds. He had seldom got very little land but what he put to green crop at the fall. He had, however, ten or a dozen acres of fallow last year—which he had not had for many years before; and he found he was out of pocket by that fallow, as the succeeding crop was much less than where he had grown the green crop. While mutton was 7½d. per lb. it paid better than wheat at £10 or £11 a load; therefore he thought they ought to do as much as possible to cultivate the land in autumn, so as to grow spring food for the sheep. Where they had a great quantity of stubble he recommended that they should make a sort of rick of it, observing that he was very glad of it for bedding. He was not for burying any straw, as he could scarcely get enough to bed his animals; and he thought they could make more of it than by burning it into ashes. He also thought that, if the land was ploughed deep, it must be after it was thoroughly cleaned, otherwise they would have the couch under the plough next time; neither did he think they should plough the manure in too deep. In reference to another point, he observed that he did not think a man could look into a piece of land closely enough to take out every bit of couch, for 1s. an acre. It was the small bits that they wanted to take out, so as to destroy the family; and he was in the habit of paying half-a-crown per acre. In conclusion, he made a few remarks on the advisability of not laying down fallows too plain, as they gained more benefit from the atmosphere when rough.

Mr. **Jackson** said, where he had had winter oats which he intended to bring to vetches, he had Bentalled between the "boyles," and cleaned the land, before he had carted the corn. He thought it highly important that they should endeavour to get the plough in the land directly after the crop was off, if not before: he always endeavoured to keep two ploughs going during harvest. There was one advantage attending autumn cultivation Mr. Darby had forgotten to mention, which was that, when the couch, or whatever it might be, was got out in the fall, it did not leave any food for the grub, wireworm, &c, or at least tended to starve these innocent creatures out. He agreed with Mr. Randall that, if the stubble were ploughed in, it was beneficial to the land, provided it was quite clean; but he thought they would be paying very dear for the use of the stubble, if it was ploughed in full of weeds. Instead of burying it, he usually adopted the system of carting it into heaps, to make useful manure.

Mr. **Fowler** thought it was an open question whether the land really did take up so much ammonia from the atmosphere as theoretical men would make them believe. He recollected some years ago there was a sort of paper war between the Rev. Mr. Huxtable and the farmers generally, about growing wheat at 5s. a bushel, and mutton at 4d. a pound. (A voice: "No, no—not 4d.") Mr. Huxtable drew comparisons about the amount of ammonia that was required to be used in the land to produce a certain quantity of wheat; and he also said the land naturally produced a certain quantity of wheat itself, without the use of that ammonia. Liebig, to contravert that, in his work on Agricultural Chemistry, said it was quite useless to apply ammonia to the land, because the air itself would supply it, without artificial application; and he illustrated it by asking how forests and woods were produced without the use of ammonia? Now, he did not mean to say Liebig was wrong in all his theoretical views; but he appeared to have forgotten that the air supplied ammonia to the shrubs and trees by its being taken up by the leaves; and these leaves, falling in autumn, supplied ammonia to the land. He thought it was a question whether theoretical men were not at fault in stating that the air supplied a certain quantity of ammonia to the land, or whether, by deep cultivation, the air did not rid the soil of certain putrid fluids, and render it in a better state to take up the manures which were applied to it.

Mr. R. **Damen** was of opinion that, generally speaking, there was no surplus labour to carry out the autumn system as it should be; but if they would make a little sacrifice, by putting on a few oxen and men for the purpose, it would pay very well, because, as had been said before, when once the work was begun, in the course of three or four years it would be much less; but it would be necessary to make some sacrifice at the time of harvest. Now, although they could not go on so fast as Mr. Jackson, and get between the "stetches," he felt sure much might be done even in small ways to begin with. The oxen on a farm were not useful in carting corn, and in some cases were not employed at all during harvest; and if they could be kept on ploughing and scarifying, and doing what was necessary, with a few hands, he believed it would be very valuable to the farmer, and conducive to the most beneficial results.

Mr. **Clarke** could not fall in with the views expressed respecting their getting in between the "stetches," because at that time of the year they had enough to do to remove them once, instead of twice; but as soon as they were removed, he thought it very essential to apply Bentall's scarifier, the stubbles being cut close. He obtained one last year; but, unfortunately, it came rather too late. Still, he had the advantage of one week of fine weather; and he was only sorry he had not had it three weeks earlier. If he had, he could have made the land as clean as any garden-ground. He put the scarifier right across the ridges, and moved every bit of it. The drags were put in behind; and then, after that, he went over it with a light roller, harrowed it, and got it in such a state that, if he had thought proper, he could have ploughed every bit of it in, without raking it into heaps and burning it. They had all got their own favourite plan; but he liked burning, because he did not relish seeing so much of this couch about. Few could say they had not any couch on their farm; and where the land was not properly drained, he hardly thought it possible to avoid having some. With respect to employing oxen during the harvest, he always found it difficult enough to get men to perform the harvest-work.

Mr. **Jackson** hoped they would not think he intended to advocate going between the stetches right through the harvest. Where he had done so was, where he had cut winter oats or rye, and when not in the thick of the harvest.

The **Chairman** proposed a vote of thanks to Mr. Darby for the able manner in which he had brought forward the subject.

Mr. **Saunders** briefly seconded the proposition; and it was carried with acclamation.

Mr. **Darby**, in returning thanks, expressed the gratification afforded him to find his observations had been received so favourably; for, although he was convinced there were not two opinions in the minds of good farmers as to the benefit of autumn cultivation, yet the subject embraced a vast variety of matters in which there must be difference of opinion. Some had light land, while others had heavy land, which would cause a difference in carrying out the details. Some land required to be "raftered" before the scarifier was put across it; but in light land it was quite as well to use the implement before being "raftered." He quite agreed with Mr. Randall that, where there was no twitch-grass, no couch, it was quite as well to proceed to deep ploughing, or to the ploughing they wanted, as to use a scarifier. The use of that implement was to clean the land; and if it were clean already, they could dispense with it. When the land was comparatively clean, men with forks would do the work; and Mr. Acland, in his Essay on the Farming of Somersetshire, stated that Mr. Hudson, of Castleacre, paid 1s. per acre for having the work done; but on the generality of farms, he (Mr. Darby) thought 2s. 6d. was the average price. He was much obliged to Mr. Jackson for having called his attention to one advantage of autumn cleaning—the removal of food for the grub and wireworm during the winter, which he had omitted to comment upon. With regard to Mr. Fowler's objection to the ammonia theory, according to which the land took nitrogen from the air, and converted it into ammonia, they must recollect that this was not all theory—that actually theory came after practice. It was a fact that our scientific men were not aware that such was the case, until the experiments of Mr. Smith, on the Lois-Weedon system, drew their attention to the circumstance. It was a generally-received fact that the soil did take up ammonia from the air; and the only difference of opinion was as to the quantity. He was sorry that Mr. Fowler had left the room before he made these remarks. With respect to burning the stubble and couch, or taking it away, he did not dogmatize on that point; for he was aware that some were in the habit of burning it, while others made use of it in different ways; and during the last autumn, he himself had taken it into the yard, leaving it as a bed for the manure, and also mixing it up with dung, in heaps, to decay. After again returning thanks for the eulogiums that had been passed upon him, Mr. Darby submitted the following resolution:

"That the more general adoption of autumn culture for the root-crop is highly desirable; that, in comparatively clean stubble, the couch grass may be forked out with manual labour, and in all other cases the land should be scarified or surface-worked as soon after harvest as possible, and the whole of the refuse either raked off for future use, burnt, or, if wholly killed, allowed to remain, as might be deemed desirable; and that afterwards, where the land is not sown to a green crop for feeding off in the succeeding spring, it should in the generality of cases be deeply ploughed, and remain in that state during the winter."

This resolution having been carried without a dissentient, the formal proceedings of the evening were brought to a close.

DISTILLATION FROM BEET ROOTS AT THE RUDDINGTON DISTILLERY.

For some time past the subject of distillation of neutral spirit from beet roots has occupied the attention of many of our most eminent agriculturists. The invention of the system is of French origin, and the practice has been and continues to be successfully carried on across the channel. At first its introduction into this country was strongly opposed by existing interests, and prejudice continues strong against it, especially in the minds of those who enjoy a lucrative monopoly. But a spirit of progress animates many of our leading agriculturists, which is not to be resisted, and, after the most urgent representations, the Government were induced to relax their prohibitive policy so far as to permit twelve stills to be established in the United Kingdom. Among those who have taken a most lively interest in the matter, Sir T. Parkyns, of Ruddington, near Nottingham, is fairly entitled to rank among the foremost. One of the first to avail himself of the permissive indulgence of the Government, he entered into an arrangement with Messrs. W. Dray and Co. for a complete apparatus for the object he had in view, and being determined to spare no pains or expense to ensure the complete success of the undertaking, he engaged the services of M. Crolard, an eminent French distiller by the new system. This distillery has now been in operation about a month, and a few days ago we had the pleasure of inspecting the premises and witnessing the process, the details of which the respected and spirited proprietor explained.

The distillery occupies a favourable position on the farm on the outskirts of the pleasantly situated village of Ruddington, and the buildings have a very neat and compact appearance. They consist of a rectangular block, comprising the distillery proper, and the Receiving and Bonded Warehouses, the latter being kept under Government lock-and-key by an officer of excise, who has an office adjoining. The distillery is about 80 feet in length by 40 feet in width, and has a spacious and lofty appearance. Here we have the machinery for the entire process, from the washing of the roots to the production of the spirit; and our object is now briefly to describe its appearance. On entering the distillery by a pair of large sliding doors at the east end of the building, the first object which attracts attention is an upright steam engine of six-horse power, with a cylindrical boiler of most compact appearance. To the right of the engine are placed the washing and cutting machines, both of which are propelled by steam. The former of these has the appearance of a large wooden trough, stands about five feet high, and is some nine feet in length by 2 ft. 6 in. or 3 feet in breadth. In this trough or cistern is placed a revolving washing or brushing apparatus, which effectually cleanses all dirt from the roots as they pass through from one end, into which they are thrown by a boy, to the other, from which they are delivered by the action of the machine. The roots vary in size, probably from 3 or 4 to 6 or 7 pounds each, and if kept constantly at work the machine will wash about twenty tons per day. The cutting machine is of small size, and equally simple in construction with that for washing, and it is also worked by steam power. As the roots come from the washer they are thrown into the cutter by a boy, and from there are reduced into thin slices. The cutting machine is calculated to keep pace, as regards quantity of work, with the washer. In following the order of the process of distillation, the next objects of interest are the fermenting vats. These are twelve in number, each capable of holding 200 gallons, and they are arranged round the opposite end of the building. On the first preparation of these vats they are filled about two-thirds full of water, which is heated by steam to some 120 degrees. A quantity of sulphuric acid is added, and the heat is then allowed to subside to about 84 degrees, when the sliced roots are put in to undergo the process of fermentation which is induced by yeast. While that is going on the "still-proper" attracts one's attention. To a person perfectly unacquainted with such matters this seems to be an exceedingly complex affair, and the process of distillation is certainly most delicate and difficult. In the first place there are five iron cylinders, each being connected with the steam boiler by a pipe for the purpose of obtaining a supply of steam, and again by means of another pipe a passage is formed by which the spirit passes into the rectifying boiler, a circular iron construction which stands about six feet high, and is probably from four to five feet in diameter. It is divided into two equal compartments, connected by means of brass pipes with stop taps. From the top of this boiler rises a formidable looking column, known as the rectifier, through which three brass pipes pass backwards and forwards from side to side, rising gradually to the top. From the upper plates of the apparatus the spirit is obtained at from 60 to 70 degrees over proof—the best running off at about the thirteenth plate from the top. The discharge is made through a glass case, which is kept locked by the excise officer, and from hence the spirit passes into the receiver.

But to return to the process. We left the sliced roots undergoing fermentation in the capacious vats. When they have been sufficiently acted upon by the acid, they are taken out by means of nets fixed on the ends of long poles, and placed in one or other of the iron cylinders before alluded to. Here they are exposed to the action of steam, which drives the spirit in vapour through the connecting pipes into the upper compartment of the boiler, in which it is condensed. It is then allowed to pass into the lower compartment, in which, by means of steam, it is again converted into vapour and rises up through the plates in the column resting on the top of the boiler, and being condensed in a worm tube it is delivered at the safe as above described. The water left in the lower part of the adjoining cylinder is then drawn off, the refuse roots removed, and the process repeated. Altogether the number of men and boys employed in the distillery is 28—14 in the day and a like number during the night, as it is absolutely necessary to keep the work constantly going on. M. Leplay, a Frenchman, is the inventor of the system.

Having described the process we now come to look at the undertaking in a commercial and agricultural point of view. The establishment of such a concern in a small place like Ruddington is an event of the greatest importance, notwithstanding the number of hands employed being, comparatively speaking, small. The erection of the premises has been going on during the late season of depressed trade, and many of the poor stocking weavers of the village have found temporary employment in connection therewith as labourers, which has enabled them to avert the hard alternative of applying for parochial aid. The constant employment of some twenty-eight hands will also add materially to the resources of the villagers. We say constant employment, because, though the process of distillation will only be carried on during the winter months, the hands will in summer take the place on the farm of the extraneous labourers which at that season every farmer has always to employ. The effect will be to increase the settled and permanent population of the parish, and ensure to that increase a continuance of the labour necessary for earning a comfortable sustenance.

As a commercial speculation we think the spirited proprietor of the undertaking has every reason to be sanguine of the most complete success crowning his efforts. The spirit produced is, as a general rule, from 60 to 70 degrees over proof, and is considered by our townsman, Mr. Parr, chymist, to be equal to any description already in use for all pharmaceutical and chemical purposes. We understand that Mr. Parr is now engaged in conducting a series of experiments with the spirit, the result of which will be made known as soon as completed. The cheapness at which the spirit can be produced will operate as an inducement to consumers to use it as extensively as possible, and there can be little doubt that so soon as the merits of the spirit become generally known there will be a universal and continually increasing demand. At present, we are informed that the production of spirit at this distillery is at the rate of some 12 or 14 gallons from a ton of roots, and M. Crolard, the manager, speaking from experience, says that when the works are thoroughly completed and in good working-order he will be able to produce 20 gallons per ton. Calculating the expenditure on a liberal scale, and estimating the roots to cost 18s. per ton, the sale of the spirit at 2s. to 2s. 6d. per gallon, proof, according to quality, will not only cover cost of production, but leave a small margin of profit, even supposing the residue of the roots to be of no value, which, however, is far from being the case, as we shall have occasion to show. The quantity of roots used will average from 15 to 18 tons per day, and the season for distillation extending over about seven months in the year, the quantity used annually will exceed 3,000 tons, so that the distillery will form a very important addition to the demand for the agricultural produce of the district. The quantity of spirit produced from the above quantity of roots will not be less, at a moderate computation, than 50,000 gallons.

But in calculating the prospective profits or losses of such an undertaking, we must not overlook the residue of the roots after the sugar has been extracted and converted into spirit. For the fattening of cattle this residue is held by some parties to be as valuable as the roots themselves. So far as experience goes it would appear to support even this extreme view; but at any rate the value at present put upon this residue is some 12s. per ton. When used along with barley flour, from hinder ends, worth about 25s. per quarter, or bean flour and cut chaff, the cattle feed upon it with amazing rapidity. The quantity of barley flour given is about 7 lbs. per day, valued at 3½d. On Wednesday, the 24th ult., three fine beasts fed in this way were exhibited in the Nottingham market, where they attracted much attention, and were quickly bought up at good prices. We are assured that cattle fed with this residue are ready for the market in nearly one-third less time than those treated in the usual way, which in itself is a very important consideration to a farmer. At present Sir Thomas Parkyns has nearly 100 head of cattle being fed on the residue of distilled roots, so that in a short time their precise value will be placed beyond a doubt. One peculiar property of this residue ought not to be overlooked. While the roots themselves lose their nutritive properties by being kept over the season, however carefully cared for, the residue may be kept for two or three years without losing any of its value. This prevents any loss being sustained by an agricultural distiller from fluctuations in the demand for the residue. In case demand should at any time fail to keep pace with the supply, the residue has only to be stored in pits, when a crust forms on the outside, and the whole mass becomes, as it were, hermetically sealed. In this state it will keep a long time without sustaining any sensible decrease of nutritive value.

We think sufficient has now been said to excite an interest in the minds of our agricultural readers in the success of so spirited an undertaking, but on some future occasion we may revert to the results which have attended the cultivation and distillation of beet roots in France.—Nottingham Guardian.

THE QUALITIES CONSTITUTING A GOOD POTATO.

Many varieties of potatoes, like new seedling grapes, are being constantly brought before the public. No sooner does one variety get advertised and sold, than another, stated to possess far superior qualities, pops into the market. All seem anxious alike for these fine new varieties, even at the expense of discarding some well-known old favourite. Just so with the potato: fresh-named, if not new varieties, are advertised weekly. We have no knowledge where they came from, or who was the fortunate raiser of these said varieties; in fact, we have no guarantee at all as to whether they are really genuine; and, should we be so unfortunate as to buy the same variety of potato under two or three different names, to whom are we to apply for redress? Of course we could not apply to the salesman, for he would tell us that he bought them for so-and-so; but who the right raisers of these varieties are, it would puzzle a conjuror to find out.

I must admit that it is not the case with new varieties of grapes; for we generally have the whole history given, with the raiser's name and address, from what variety raised, where and when exhibited, with its good qualities, &c.

This is precisely what we wish those who advertised new or fresh varieties of potatoes to do. Such a method would show good faith, and protect us from buying so many duplicates. At present it frequently happens when a person has a favourite variety of potato, and does not know its name, that he christens it himself, and gives it away to his friends with this new name attached to it. Again, if he should tell his friends that he does not know the name, it is more than likely that they will call it by the giver's name, such as "Mr. So-and-So's Kidney."

A miller in this part of the country had some fine kidney potatoes, of which he did not know the name: and when he distributed them they were christened Miller's Kidney; and this variety is a great favourite round our neighbourhood, but is no other than the old Midsummer Kidney. So, the Champion Kidney is identical with the Albion; yet both have different raisers' names.

There are, also, many varieties now in cultivation that are known only by their names; their origin was never made public. Many new varieties that have found their way into the market are entirely worthless; and many old varieties of really good value have either been discarded for new ones, or have been entirely lost through bad management or neglect. It is a well-known fact that some varieties that are of first-rate quality when grown in some parts of the country, are entirely worthless when grown in other parts, and to this fact we should all pay great attention. For instance, how very different are some of the potatoes grown in Lancashire to what they are in this neighbourhood! In the former they boil like a ball of flour, in the latter they are like a ball of wax; but I think it must be admitted that more potatoes are condemned through bad cooking than from any other cause. The more waxy the potato, the more salt will be required for the water to boil them in.

In raising new varieties the following points are indispensable, and none but those that have such merits described below should be submitted for sale to the public; for it is far more important to the public at large to have a first-class potato than a first-class grape offered to them. Potatoes are food for millions, while the grape is only a luxury for the rich.

A good potato should be in size moderate; shape regular—that is, free from deep eyes, warts, and crooks; skin roughish; when boiled, entireness, dryness, and firmness; agreeable taste, earliness, productiveness, short haulm, freedom from disease, and long keeping.

A large potato is frequently hollow, and cannot be conveniently cooked, and is also liable to be badly boiled. A warty or deep-eyed one suffers waste in peeling; a smooth-skinned one is generally more waxy than a rough one; a bursting one, in boiling water, suffers loss; a firm and dry one is mealy; an early ripening one is less liable to be attacked by disease; and productiveness is requisite to make the crops profitable. Short-haulmed varieties can be planted closer together than long-haulmed; freedom from disease is the great point we wish to acquire, and can certainly only be attained by peculiar methods of cultivation; lastly, a good keeping variety that retains its flavour is indispensable, for the sake of affording its supplies up to the period of Midsummer.

The history of those varieties which are generally favourites now in cultivation would, I am sure, be highly appreciated by your readers; and I trust that your correspondents that are in possession of the history of any well-known variety will kindly communicate it through these valuable columns. Let us reason together, and see if we cannot come to some good understanding on this one neglected point. I promise to lend all the aid in my power, having grown over one hundred so-called varieties within the last four years.—Edward Bennett, Gardener to Sir O. P. Wakeman, Bart., Perdiswell Hall, Worcester, in "Cottage Gardener."

THE LONDON, OR CENTRAL FARMERS' CLUB.

THE REARING AND DISEASES OF LAMBS.

The usual monthly meeting of the Club took place on Monday evening, May 3, at the Club House, Blackfriars.

The subject for discussion, assigned for introduction to Mr. J. Marshall, of Riseholme, Lincolnshire, was thus stated on the card:—"The breeding, rearing, and management of lambs, as a successful means of providing against pleuro-pneumonia and consumption."

The chair was taken by Mr. Owen, of Clapton; and among the other gentlemen present were — Messrs. Owen Wallis, J. Tyler, H. Trethewy, J. A. Williams, E. Little, C. T. James, J. B. Spearing, J. T. Davy, J. Paull, — Paull, junr., Shaw, J. H. Pocock, J. Russell, L. A. Coussmaker, F. Dyball, R. Cobb, J. Cressingham, E. Purser, R. Marsh, C. J. Brickwell, G. S. Harrison, T. Fordham, E. H. Bentall, J. G. King, J. Odams, R. B. Hammond, S. Skelton, Owen, junr., C. Howard, F. Withes.

The **Chairman** in introducing the subject characterised the sheep as the best friend the farmer has. He also spoke to the ability and experience of Mr. Marshall as especially qualifying him to introduce such a question to the members of the Club.

Mr. **Marshall** said: Mr. Chairman and Gentlemen, having been requested by the committee at the annual meeting of this Club to propose a subject for discussion at one of our monthly gatherings, I ventured to do so in the earnest expectation that some member whose experience and opinion as a flock-master might have entitled him to greater consideration would have undertaken the task of explaining the cause, or, perhaps, rather of suggesting a successful means of guarding against pleuro-pneumonia and consumption in the breeding, rearing, and management of lambs. I am inclined to approach this most vexatious subject with the greatest diffidence from a knowledge of the many difficulties by which it is at all times unavoidably surrounded. I know of nothing more perplexing, or more productive of anxiety in the mind of a Lincolnshire sheep-breeder, than the ordinary management of his flock, upon a light turnip land farm, during the months of July, August, and September, where it is all arable, or where he has only a small portion of poor weak grass land intermixed; his reliance for its support being placed entirely on the prospect of a good or bad crop of seeds, as a part and parcel of his usual four-field course of husbandry. I will suppose a farm of 500 acres, containing one-fifth of inferior old grass land, and four-fifths of arable dry turnip land, upon which a flock of 400 ewes would, I presume, be kept. One hundred acres of this would, according to the ordinary four-field system, be sown down with seeds, 80 acres for feeding, with 20 lbs. per acre of white clover, trefoil, ribgrass, and parsley seeds; and a very small portion (say about a peck per acre) of any kind of common or dwarf ryegrass, in short with any kind of ryegrass rather than Italian—a plant I have been compelled, from sheer necessity, to discontinue growing to any extent, from the fearful destruction it year by year occasions to the succeeding crop of wheat: it is, in fact, on the thin dry soils of Lincolnshire, positive destruction to it; therefore as a grass for the purposes of alternate husbandry it has been, and I think deservedly so, well nigh altogether exploded; and unless the lands intended for autumn sowing can be ploughed some weeks before putting in the wheat, which should not be deferred beyond the middle of October, no security for a crop after Italian ryegrass can be reasonably calculated upon. The remaining 20 acres will be sown down with 20 lbs. per acre of red clover or cow-grass, for mowing and making into hay for the cart horses, and subsequent eddish for the lambs after they are weaned. Out of a flock of 400 ewes, it mostly happens that from loss in lambing, and from other causes incidental to a breeding flock, not more than 350 to 360 return to their pastures with lambs by their sides; and if 100 of these are fortunate enough to rear two lambs each, it is as many as may be reasonably looked for. There will then be 250 single lambs and 100 pairs to be provided for upon 80 acres of feeding seeds, and 100 acres of old grass land of indifferent quality; 35 acres of the best planted seeds will be stocked with the 100 pairs at the rate of about three ewes and six lambs, or in all nine ewes and lambs per acre. These are allowed half-a-pound to a pound of the best feeding rapecake, or a mixture of two-thirds rape and one-third linseed cake per ewe; or if preference be given to corn, either a pint of oats, barley, peas, or beans, with a small addition of cut hay, clover, or malt-culm, as circumstances and the growth of the pasture may suggest. The remaining 45 acres of seeds will, if tolerably well planted, carry four ewes and single lambs per acre, with or without the foregoing addition of cake or corn, as seasons and the abundance or otherwise of keeping may seem to demand. The remaining 70 ewes and lambs will be grazed on 35 acres (at the rate of 2 per acre) of the old grass land; 50 acres of which will also carry (at the rate of 3 per acre) 150 of the best she-hoggetts, kept back for the purpose of restoring the breeding flock to its original number at Michaelmas. The remaining 15 acres are put into meadow for hay. The whole of the flock are regularly supplied with water, and if they have no pond or running stream to avail themselves of, they must be provided with water-troughs set about the fields for that purpose, and these should never on any account be permitted to be quite empty. I believe, in hot weather, sheep well supplied with water require a great deal less food, and are more comfortable and healthy, than in those localities where this desirable luxury is beyond their reach.

The summer-fed seeds in each of the preceding cases will always be eaten down extremely close; indeed, in a dry summer, it would to a casual observer appear as if they had little or nothing to live upon; yet this apparent scarcity may be relieved by means of the addition of the artificial food to which I have before alluded, and which I think may be always profitably employed in all cases of heavy stocking. In speaking of rapecake, I allude to cake made from rapeseed only; and I have generally found that an addition of linseedcake—say an equal portion of each—might be profitably used after the 1st of July, as about that time the lambs begin to eat a little, and it is very important to get them to do so at the earliest possible period, in order to prepare them for weaning, which generally takes place between the 20th and 30th of the same month. It is at this time that the difficulty commences against which we have so continually to contend. I will suppose the weaning to be concluded by the 25th of July, by, as far as it can be done, removing the ewes from the lambs for a few days, until the latter become fairly settled, and return to their troughs. They are then to be taken from the summer-fed seeds, and regularly laid out over the whole of the 100 acres of old grass land and clover eddish, which will be by this time ready to receive them, in something like the following proportions:—150 of the weakest and worst lambs upon the clover eddish, and the 300 upon the old pasture, the whole receiving ¼lb. of linseedcake per day, with a few oats, bran, and malt-culm; or, in short, with any dry artificial food they may incline to eat best, in addition to a few cabbages, four or five acres of which should invariably be grown for this especial purpose. The early York variety, sown in seed-beds in August, and transplanted early in October on well-manured ridges, will be quite ready for eating by the 1st of August, and is by far the best green food given them on grass land, till the 10th of September. They may then be turned upon the early turnips, which, by good management, they soon learn to eat; after which, in the ordinary course of events, no further difficulty or danger is to be apprehended. There are cases, however, in which good management and the greatest assiduity and attention seem to be altogether of little or no avail. I have seen large flocks of lambs, apparently healthy and full of vigour when taken from the ewes, in three to six weeks afterwards the most miserable-looking animals imaginable; and in a month later, perhaps, one-fourth of them dead, or reduced to a state of wretchedness which no nursing, however careful, can ever overcome. The malady to which I am now about to allude, and which for the sake of distinction I will call consumption (leaving pleuro-pneumonia, which is altogether another and a separate disease, entirely out of the question), is a most insidious, and so far it has appeared to be an incurable disorder. In what manner or at what precise period it is engendered, is at present a matter involved in mystery. So long as the lambs are dependent upon the ewes for their support, they appear to go on well enough, and look healthy and flourishing; but as soon as they are deprived of that support, and the keeping upon which they are put does not quite agree with them, they are attacked with this formidable disease, and die by hundreds. Mr. Jekyll, of Lincoln, a person of great eminence as a veterinary surgeon, and in extensive practice, has favoured me with the following remarks upon this subject:—"The earliest symptom which I have observed has been diarrhœa for one, two, or three days, very soon after which a cough commences, and in a short time becomes very troublesome. The lamb partially loses its appetite; a large quantity of green frothy mucous is constantly discharged from the nose; the cough begins to be very distressing; low and debilitating fever sets in, with a complete loss of appetite, great debility and emaciation, under which, and the irritation of the now all but constant cough, the lamb sinks and dies. On making a *post mortem* examination, the first thing which attracted my attention was the very pale and wasted condition of the muscular structures, while a considerable amount of fat remained; the stomach and intestines were pale, and contained very little food, with water, mucus, and fœtid gases; the liver was discoloured, and a little softer than natural; the heart was pale, but otherwise quite healthy; the lungs about their natural size, but marked with singular patches on their surface, while some parts of them appeared natural and healthy. On cutting into the lungs while yet warm, a great number of filaria, small thread-like worms, struggled out of the bronchial tubes, mostly from those parts of the lungs which were inflamed. When I opened the larger bronchial tubes and the trachea, I found a great number of these intruders moving about with as much rapidity and ease as the size of their strange prison-house would allow: their ceaseless vermicular motions appeared exactly calculated to produce great irritation, fever, incessant cough and continuous discharge. As a cure I have tried the internal exhibition of small doses of turpentine with cold gruel, but without success. I have also made them inhale chlorine gas; and the few on which I experimented recovered, but it was late in the season, and I think it likely they would have recovered without this. I intend, however, to make a further trial of this remedy; but while a ready means of cure is of importance to us, the cause and a preventive are of much greater. The history and stages through which these pests pass, and how they enter animal bodies, would very much aid us; but I fear all this is wrapt in a shroud of mystery so deep that science must labour long and perseveringly before she can bring forth the naked facts for the benefit of man. I have observed this affection in all sorts of seasons and on every variety of land, and under every system of management in this large sheep-breeding district." In closing my remarks on this occasion I must be permitted to observe, that however inconclusive and necessarily imperfect in many respects the paper I have had the pleasure to read to you may be considered, its distribution into those districts where the subject of this evening's discussion may be better and more extensively understood, may lead to an investigation of the circumstances and causes of this most mysterious disease, and prove eventually the means of discovering preventive remedies, if not of curative appliances for it.

Much may be done by carefully watching its rise and progress during the summer months. Whether the animalculæ supposed to produce the evil be really viviparous or oviparous is a question which can only be cleared up and settled by experiments hereafter, to be conducted by persons skilled in that department of science, and especially by those possessing a comprehensive knowledge of entomology. Gentlemen, I beg most sincerely to thank you for the kind and patient attention with which you have done me the favour to listen to my long and tedious, though, I hope, not altogether uninteresting address. My own research has hitherto, I am bound to confess, proved unsuccessful. May that of others succeed better. May their labours receive a brighter reward, and their inquiries be unobstructed by any of those impediments over which we have no control, and that have so far baffled the combined efforts of modern investigation.

Mr. J. W. PAULL (Ilminster, Somersetshire) said, as a flockmaster, he felt deeply interested in this subject, having suffered very considerably from the malady referred to by Mr. Marshall, on his farm in the West of England. Mr. Marshall had told them that he finished weaning his ewes as late as July. In the West of England they got the greater part of their lambs not later than January, and they were all off the dams by April. They were, therefore, obliged to have recourse, to a considerable extent, to artificial means of feeding; they were obliged to put their lambs on the best food they could command, for the purpose of supporting them during the cold backward springs. He had, as he had already intimated, been most unfortunate as regarded his lambs. They were seized with a cough, accompanied with a great discharge from the mouth; and when they were dissected the pipes of the lungs were found to be full of small worms. How the worms got there he had never been able to find out. The only means of providing against the evil, that he had discovered, was not to allow the lambs to go upon old pastures. In a backward spring they were obliged to resort to young grasses and tares. His own county appeared to be much more forward than Lincolnshire. The only preventive to the disease, which he had been able to find out, was to change them on pastures which had been fed by beasts the previous year. (Hear, hear). That had sometimes produced a considerable effect. Still he had been a great sufferer from this malady, and he had come to London almost on purpose to hear whether Mr. Marshall could suggest any effectual remedy.

Capt. DAVY (South Molton) had suffered very much from the malady in question, which in his part of the country was called the scour. He had lost an immense per-centage of his lambs. They were dropped chiefly in January and February, and weaned before the end of May. By the end of June numbers of them were taken with a scouring, and a discharge from the nose, and they were soon dead. The best preventive was to remove the lambs to what was termed in Devonshire the after-grass, that was, the grass which came after mowing. He believed one of the causes of this disease was that many persons breed their animals of too delicate constitutions, with too small necks and legs of muttons. If our sheep were of more hardy constitutions they would not suffer so much. As long as lambs lived on their mother's milk (nature's best food, and most easily assimilated by young animals) they did very well; but when they had to shift for themselves, their delicate systems were unable to digest their food and absorb its ingredients. A disordered stomach was the first result; disease followed, and ultimately death.

Mr. PAULL agreed with Captain Davy that it was the after-grass, as well as the change of feeding, that they must look to for relief.

Mr. O. WALLIS (Overstone Grange, Northamptonshire), said in this case they ought to be careful lest they should confound cause and effect. He believed that the worms which had been spoken of as generated in the lambs were the result of previous feeding (Hear, hear). The case resembled that of the discovery of flukes in the livers of rotten sheep. He was inclined to attribute the evil in a great degree to the over-stocking which seemed to prevail in certain districts. The result of this was that the sheep had to search so near the soil for their food that they took up something that was pernicious to the system; disease was generated, a parasite was formed, and that parasite was probably the worm which had been described by Mr. Marshall in his able paper. When he first commenced farming he had only an arable farm; and having no means of changing the food of his stock, he used to lose a very large proportion. It was not at all uncommon for him then to lose a hundred sheep a year on a farm of 400 acres. Under these circumstances he felt that he must either relinquish the breeding of sheep or get some grazing land. He adopted the latter plan. In feeding his sheep he changed from seeds to pasture, and back again from pasture to seeds; and the consequence was that where he formerly lost a hundred sheep he now lost about ten. He considered it essential that there should be a change of pastures, especially with regard to sheep. He also held it to be very important not to let sheep graze very closely. Moreover, sheep should be fed with young bullocks or neat-stock: they got on much better together than separately (Hear, hear). He was also of opinion that if two years' seeds were adopted instead of the four-course system, farmers would be enabled to keep a larger amount of stock, and grow a greater quantity of corn at a less proportionate cost than was incurred at present. Where there was not a sufficient mixture of pasture and arable land, if there were two years' seeds to fall back upon, the malady which appeared to be so prevalent would perhaps, to a great extent, be avoided. At all events, he believed the chief preventive was change, whatever the change might be.

Mr. LITTLE (Landhill, Chippenham) would say a few words with regard to the management of lambs by the flockmasters of Wiltshire. He agreed with Mr. Wallis and Mr. Paull, that change of food was what must be chiefly relied upon as a preventive of disease among sheep. On the sheep-breeding farms of Wiltshire there was no rich pasturage to be found. There they knew nothing of the disease which had been described by Mr.

Marshall, and he was inclined to the opinion that that disease was in a great measure generated by the rich pastures of Lincolnshire. In his county the lambs usually fell in the month of February and March, and after remaining in a sheltered fold till strong enough to stand the weather, they returned to the field to the Swedes or turnips; and after weaning, which took place generally in May or June, the great point with the Wiltshire farmer is to have ready as many changes of food as possible for their lambs; and some farmers in the county (those who produced the best lambs) gave them four or five changes in the day. On the Wiltshire hill farms a large quantity of sainfoin was sown, and he believed that was the best preventive for what was termed "scour" or diarrhœa. Whenever they had disease among their lambs, they naturally turned to sainfoin as the best remedy. He did not know that he could add anything further that would throw any light upon the subject. He knew nothing of the malady in question, but, in his opinion, the best remedy would be found in a change of food, and in the use of sainfoin, where it could be grown.

Mr. WILLIAMS (Baydon, Hungerford) said this subject was one of the greatest importance to farmers generally. When cattle or horses were attacked with disease, the evil might generally be met by having recourse to the veterinary surgeon; but sheep appeared to be beyond the aid of the veterinary surgeon and of science, and previous speakers had alluded to the immense loss which they had themselves sustained, apparently without the power of helping themselves, in their flocks. Coming from the same county as Mr. Little, he could corroborate what had fallen from him, in reference to the absence of the disease in question in that part of the country. In fact, they knew nothing of it from their own experience; it was a malady which was, happily, quite foreign to them. At the same time they were subject to another disease, of a most awful character—a disease which was almost as ruinous as that which had been described by a gentleman from the North. He happened to have travelled to London that day with their Chairman and with Mr. King, and the latter gentleman told him, if he remembered rightly, that he had lost forty lambs within a week; and another gentleman named Pike, who was also present, said he had lost fifty in the same space of time.

Mr. KING—Within a fortnight.

Mr. WILLIAMS—Well, this difference was not very material. Now the disease from which their losses occurred was, as he had already intimated, quite distinct from that described by Mr. Marshall. It differed from the disease in Lincolnshire in this respect, that it depended on the ewe. Hence they had a remedy; but then the remedy was, in this, as in many other cases, worse than the disease. The remedy was to wean the lambs; but the effect of this was that, while they saved the lamb from the scour they injured it in other respects. The question for discussion as stated on the card referred to pleuro-pneumonia and consumption. Now in the case of the disease in his district there were no symptoms observable over night, and they sometimes found three or four of their lambs dead in the morning. If that was consumption, it was certainly very rapid consumption. He had often known a full-grown sheep to go off in the same way. When the shepherd left the fold at night, there was apparently nothing at all wrong: when he went in the morning the sheep was dead. It was a curious fact that in these cases death appeared generally to take place about four o'clock in the morning; and how the disease was to be accounted for he could not pretend to say, but it was most important that something should be done, if possible, to discover a remedy. Their Chairman had told him that he had lost as many as seventy fat lambs within a week. There were three partial remedies to which he would for a moment allude. The first was that to which he had already referred, namely, the early weaning of the lamb, which of course generally had the effect of spoiling it. He had himself resorted to this remedy; and after losing ten lambs a night, he had stopped that species of loss by weaning the remaining lambs at once. Another remedy was to counteract the disease in the ewe by feeding the lambs on something that would act as an antidote; and he found one of the best things was to let the lambs feed on a crop of wheat. As in all probability a great deal of this year's wheat would be lost through excessive luxuriance, and as wheat now fetched so low a price in the market, this remedy appeared to him deserving of special attention. Mr. Little had spoken of the great advantage of feeding on sainfoin. Now that was almost a specific against disease; he had scarcely ever known it fail to arrest this fearful disease in a flock of sheep.

Mr. WALLIS wished to know whether the lambs in Wiltshire suffered from scour before they died so suddenly?

Mr. WILLIAMS said there was not the slightest approach to scour, although it was called so. The most pratical farmer, in looking at his flock over night, would be unable to discover any symptom of disease; in the morning the animal was dead, and a little mucus was found to have escaped. The case was evidently one of rapid inflammation.

Mr. WALLIS had understood Mr. Williams to speak of sainfoin as a certain remedy for scour.

Mr. WILLIAMS said they called it scour, but they never saw the scour till death; it always came away with the life of the animal.

Mr. J. G. KING (Beedon, Newbury) said: Having lost a great number of lambs within the last fortnight, he had hoped that some gentleman present would have been able to tell him how he ought to treat his lambs. One mode of treatment had been suggested which he had himself adopted, and which certainly had not proved a preventive. He had allowed a flock of lambs this season to run over two or three fields of wheat, and the result was that he had lost more of those lambs than of the lambs which had been shut in.

The Rev. C. T. JAMES said the subject of the treatment of lambs was essentially connected with that of the condition of the ewe. No child could ever be reared well if the mother from whom it obtained nourishment was at the time of affording it in bad condition. There was one point to which he was particularly anxious to direct attention. They all knew that this had been a great year for lambs, the number of couples being very great. Now his own experience went to show that where there was a couple of lambs there was much more disease and liability to death than where there was a single lamb. He had observed that the teats of ewes which had two lambs got into such a state, that their appearance resembled that of smallpox in the human being, and that this was not the case where there was only one lamb. He thought a great deal of harm was done by the excessive interference of many shepherds in the way of manipulation with regard to the ewes. It would in most cases be far better to leave nature to herself.

The **Chairman** said he had very little to add to what they had already heard. Mr. Marshall had given them a very excellent paper, but the disease to which he referred must be a very different one from that which prevailed in his own locality. Mr. Wallis spoke of low feeding as one cause of disease; now he always considered sheep highest fed were most subject to be attacked (Hear, hear). He thought that the state of the blood had a great deal to do with the matter. As intimated by Mr. Williams, he had lost a great many lambs from disease. He lost as many as seventy in one field in fourteen days. His losses generally occurred at quite a different period from that mentioned by Mr. Marshall; they occurred when the lambs were from six to twelve weeks old. He quite agreed with Mr. Williams that the food of the mother was the great source of the disease and that the only means of avoiding it therefore was to wean them early. The lambs that died were all taken off in the same way. He never saw one recover after being affected. The chief symptoms were a slight foaming at the mouth and a nodding of the head as if the animal were feeding. His sheep had not escaped; he had something like 200 sheep feeding in yards at that moment, and he had lost fourteen of the flock since he put them there. He agreed with Mr. James with regard to the great loss which was generally sustained where double couples. He had lost from thirty to forty lambs that were twins; and, as regarded his ewes, while on the one hand he had lost upwards of thirty ewes that brought two lambs, he had lost only two ewes that brought a single lamb. In February the twins came very thick, and the ewes being short of milk he had recourse to cow's milk to make up the deficiency. The lambs (being all double couples) continually sucking, and from the sharp and cold east winds, the ewes' udders became sore, and the lambs had bad mouths, so much so their lips were three times as thick as they should be, and the teeth projected in front. He used alum and treacle, but was obliged to call in veterinary surgeon who pronounced it small-pox. It certainly had every appearance of small-pox, the udders being in spots, all sores and a scab. They were put by themselves in warm yards, dosed and ointment applied till cured.

Mr. **Marshall** then replied. There appeared, he observed, to be the greatest difference between the system of managing lambs adopted in the West of England and that adopted in his own part of the country. He did not at all agree with Mr. Wallis that over-stocking was the cause of his losses. Last year, when he lost the greatest quantity of lambs that he ever lost in his life, his pastures were exceedingly good. As regarded the changing which was suggested, he took it for granted that if they had a quantity of sheep that were doing badly a change must be desirable. In Lincolnshire, however, they never changed the sheep which were depastured upon seeds. When they were taken out of the lamb-yard they were put upon a field of seeds, and were never taken out of it till they were weaned. As regarded the quality of the grazing land of North Lincolnshire, he must say it was naturally almost as poor as any on earth. He concurred in what had been said with respect to the value of sainfoin. He had himself a field of sainfoin, and he never saw his sheep do better than they did on that. Whenever any of them were attacked with diarrhoea he put them on sainfoin, and they were cured within a week. It was to be regretted that no gentleman had given them the result of a *post mortem* examination of any of the lambs that had died in Berkshire or the West of England. Mr. Williams had made some interesting remarks as to the symptoms of the disease in his own locality, but he had not said anything which tended to show what the disease arose from. As to the diseased udders, of which Mr. James had spoken, having himself long suffered from that cause, he could assure him that the evil was not confined to ewes that had pairs of lambs (Hear, hear). He had seen that malady among his flock as many as fifteen or twenty times this year, and it prevailed quite as much among sheep that had only one lamb as among those that had two lambs. He never observed any difference in that respect. There was a very good cure for that malady—an ointment which was sold in a market town of Lincolnshire. If that ointment were applied to those parts of the udder which were cracked, the application was sure to effect a cure within two or three days.

The Rev. C. T. **James**: Can you give the name of that ointment?

Mr. **Marshall** named Mr. Cartwright, of Horncastle, as the only druggist from which the ointment could be procured.

Mr. **Williams** (Baydon) wished to be allowed to make one observation in reference to what had fallen from Mr. Marshall about a *post mortem* examination. He thought that was a matter which had been too long neglected; and he was convinced that if some dead lambs—say five or six from different farms—were sent to the Veterinary Professor of the Royal Agricultural Society for examination, he would with great pleasure do what was required.

Mr. **Corbet** observed that the Professor had asked for them over and over again.

Mr. **Williams** trusted, then, that something would soon be done in the matter (Hear, hear). All he could say on the subject was that the disease was an exceedingly rapid one. When the shepherd left the flock in the evening, the animals appeared quite well; the next morning they were dead. On cutting some of them open, he had found the bowels void of food, and in a high state of inflammation. All the smaller bowels of the animal were filled with a nasty-looking fluid, as red as blood. He thought they were all greatly to blame for not having taken proper steps to ascertain the cause of the disease, as that might have led to the discovery of a remedy.

Mr. **Wallis** said, he appeared to have been misunderstood both by Mr. Marshall and by the Chairman. They appeared to have supposed that he advocated uxuriant pasturage. Now he did nothing of the kind. What he contended was, that they should not keep so many sheep per acre on the land, but that they should have a given number of cattle with the sheep, in order that the two together might keep down the pasturage. He never saw good management where the pasturage was rank.

Mr. **Trethewy** moved a vote of thanks to Mr. Marshall for his excellent introduction.

The Rev. C. T. **James** in seconding the motion said, he believed the reason why there were not more flock-masters present, was that it happened that several of the great sheep fairs were being held at that time.

The motion was then put and carried unanimously.

On the motion of Mr. **Little**, seconded by Mr. **Marshall**, thanks were also voted to the Chairman, and with this the proceedings terminated.

IRISH AGRICULTURAL STATISTICS.

We give the following Tables from a return which has just been presented to both Houses of Parliament, by the Registrar General for Ireland. There are other valuable Statistical Tables contained in the series, but we think those we have selected will be found most instructive and interesting :—

TABLE OF THE ACREAGE UNDER CROPS, THE ESTIMATED AVERAGE PRODUCE PER STATUTE ACRE, AND THE TOTAL PRODUCE OF IRELAND IN 1856 AND 1857.

CROPS.	Years.	Extent of Crop.	Average Produce per Statute Acre.	Estimated Total Produce.
		Statute Acres.	Barrels, 20 stones.	Quarters.
WHEAT	1856	529050	5·2	1629963
„	1857	559646	5 0	1662957
			Brls., 14 st.	
OATS	1856	2037437	7·8	9236869
„	1857	1980934	7·2	8895347
			Brls., 16 st.	
BARLEY	1856	182796	7·5	757536
„	1857	211288	7·8	848783
BERE	1856	6554	7·7	32778
„	1857	6026	7·3	28553
			Brls., 20 st.	
RYE	1856	13337	5·4	44520
„	1857	15348	5·2	49252
			Bush., 8 gals.	
BEANS & PEAS	1856	16034	27·0	53945
„	1857	13586	25·9	44046
			Brls., 20 st.	Brls., 20 st.
POTATOES	1856	1104704	31·9	35268345
„	1857	1146647	24.5	28074751
			Tons.	Tons.
TURNIPS	1856	354451	12·9	4581172
„	1857	350047	12·5	4360197
MANG. WURZ.	1856	22071	13·0	287838
„	1857	21449	13·9	298515
CABBAGE	1856	27968	11·9	332650
„	1857	30011	10 9	327875
			Stones, 14 lb.	St., 14 lb.
FLAX	1856	106311	28·3	3006653
„	1857	97721	23·7	2315980
			Tons.	Tons.
HAY	1856	1302787	1·9	2492732
„	1857	1369892	1·9	2566644

TOTAL EXTENT UNDER CROPS.

Years.	Statute acres.
1856	5753547
1857	5859117

The following changes in the extent and produce of the Crops, between 1856 and 1857, according to the foregoing Table, were as under—

CROPS.	Increase or Decrease in the Extent under Crops in 1857.		Increase or Decrease in the Total Produce in 1847.		Increase or Decrease in the Average Yield per Acre in 1857.	
	Increase. Acres.	Decrease. Acres.	Increase. Qrs.	Decrease. Qrs.	Increase.	Decrease. Barrels.
Wheat	30596	—	32994	—	—	·2
Oats	—	56503	—	341522	—	·1
Barley	28492	—	91247	—	—	·2
Bere	—	528	—	4220	—	·4
Rye	2011	—	4732	—	—	·2
			Tons.	Tons.	Tons.	Tons.
Potatoes	41943	—	—	899199	—	7·4
Turnips	—	4404	—	220975	—	·4
Mangel Wurzel	—	622	10677	—	·9	—
Cabbage	2043	—	—	4775	—	1·0
Hay	67105	—	73912	—	—	—
				St., 14lb.		St., 14lb.
Flax	—	8590	—	4316	—	4·6

The **Agricultural Statistics** of **Scotland** for 1857 having been published, the following is a comparative statement of the Acreage, in statute measure, and of the produce, in quarters, of the principal crops grown in Ireland and Scotland in that year :—

CROPS.	IRELAND, 1857.		SCOTLAND, 1857.	
	Extent.	Total Produce.	Extent.	Total Produce
	Acres.	Quarters.	Acres.	Quarters.
Wheat	559646	1662957	223152¼	769373
Barley	211288	848783	198887¾	820554
Oats	1980934	8895847	938613¼	4093845
Bere	6026	28553	21607¾	83972
Beans and Peas	13586	44046	42873¾	129720
		Tons.		Tons.
Turnips	350047	4360197	476091¼	6690109
Potatoes	1146647	8509344	139819	430498

The comparative yield per acre of the principal Crops in Ireland and Scotland for 1857 was as under—

CROPS.	Produce, per Statute Acre, by WEIGHT.		Produce, per Statute Acre, by MEASURE.	
	IRELAND.	SCOTLAND.	IRELAND.	SCOTLAND.
	Barrels.	Barrels.	Bushels.	Bushels.
Wheat (brls. of 20st:)	5·0	5·6	23·8	27 6
Barley (brls. of 16 st.)	7·3	7·5	32·1	33·1
Oats (brls. of 14 st.)	7·2	7·0	35·9	34·9
Bere (brls. of 16 st.)	7·3	6·0	37·9	31·9
Beans and Peas	—	—	25·9	24 2
	Tons.	Tons.		
Turnips (in tons)	12·5	14·0	—	—
Potatoes (in tons)	3·06	3 08	—	—

COLLECTIONS OF PRODUCE AND ANIMAL FOOD.—THE KENSINGTON MUSEUM.

We have from time to time drawn attention to the various efforts making to develop the industrial products and also the economic uses of plants and animals. Every step in this direction, properly carried out, is calculated to be of eminent benefit in a national point of view, in diffusing sound practical information, and in developing that kind of knowledge which tends greatly to promote the more extended application of known products, as well as the introduction and experimentalizing on or trial of new ones. In the metropolis we have already three important collections, all rapidly increasing, and which, even in their present condition, are highly useful for study and investigation.

The Museum of Economic Botany at Kew, under the able superintendence of Sir W. Hooker, has already attained to an eminent position for amount and variety. The new museum building has given greater space for the display of specimens; but is already full, and proves how rapidly any such collections grow, when once commenced. The distance, however, shuts it out from ready access for reference by the merchant, the broker, manufacturer, or cultivator. Moreover, the strictly scientific classification into botanical groups, families, and orders, renders it difficult for any but a well-informed botanist to find out and compare plants and products of a similar character. Thus, any one interested specially in gums, fibres, woods, or food-products has to wander over very many rooms and examine scrupulously dozens of cases to obtain the information he is in search of.

Another diversified trade collection has been formed by the Crystal Palace Company in one of the upper galleries of the building at Sydenham. But the visitors seem to be totally unaware of it, and its isolation and remoteness draw few to the inspection.

The East India Company's new Museum is another step in the same useful direction. The Directors have collected from the length and breadth of their vast territories samples of everything that is commercially useful, whether of merely local use in the East or forming articles of trade. And certainly, amid the glitter and gorgeous splendour of Eastern jewellery shown, the raw products in the galleries form by far the most important feature for careful study and inspection.

The Royal Agricultural Society of England has taken no step towards forming any collection of agricultural produce, indigenous or foreign. In this it is at least behind the French, American, and other similar societies. The cultivation, manufacture, and preparation of the ingredients for our daily bread are among the most important investigations which can occupy attention.

The interest which may be given to a scientific investigation of the most ordinary matters of everyday life is shown by the popular disquisitions into the "Chemistry of Common Life," by the late Professor Johnston. A consideration of this matter has doubtless induced Dr. Lyon Playfair to add a food department to the trade gallery of the South Kensington Museum, which already, under his indefatigable scientific supervision, has grown to very respectable proportions, and bids fair, as a whole, to form one of the most interesting and nationally useful features of that branch of the Science and Art department. It will form a model well deserving imitation in the provinces and in other countries. The arrangement and classification adopted are, first the collection and display of the principal articles of animal food as far as these can be shown; next the cereals, including all the leading varieties grown here or elsewhere, and the products obtained from them. The collection is particularly interesting in the samples of maize, millets, rice, and other grains, not much seen in this country. There is also a very large and fine collection of leguminous grains and pulse, including the chief varieties of lentils and lupins, chick peas, and so on. The roots, tubers, and bulbs, botanically arranged, follow next in order, succeeded by the vegetables of which the stalk, leaves, or top are eaten. We then pass on to the fruits cultivated in this country or imported, and the fruit products. Another group is devoted to the esculent flowerless plants, a division of which too little is known; such as the mushroom tribe, lichens, and algæ, very many of which serve as portions of food in different countries. The sugars, starches, gums, and vegetable extracts, form another very important division, full of instructive information by means of descriptive labels and printed particulars, although several of these are only yet in the course of arrangement. The vegetable fats and oils, essential or solid, used in confectionary and for alimentary purposes, come next, and are followed by a fine collection of condiments, spices, and aromatic flavouring herbs. The substances used for making warm infusions or beverages follow, and are illustrated by diagrams of the plants producing them, by all the commercial varieties, and by chemical analyses. A curious feature in the collection is the various narcotics, masticatories, and intoxicating drugs used in different countries, showing the depraved taste for stimulants, which, in one form or other, seems universally to prevail. And, lastly, we have the different fermented liquors—the beers, the brandies, the wines, and other prepared drinks.

One of the most important features for study in the food section is the chemical analysis of each particular article, whether grain, pulse, root, or leaf, used for dietetic purposes. Those even who have no general knowledge of chemistry can here gain a popular and correct idea of the nutritious and useful parts of food, and learn something of the heat-giving and flesh-forming components; and thus comprehend why particular kind of food have been used from time immemorial by particular nations. The proportions of fat, gum, sugar, and starch, and of mineral substances and fibre in each, are here specially shown in their due proportions in a given amount; and are therefore more easily understood and impressed on the mind by the eye than through the mass of per-centage figures and symbolical characters usually given in works on chemistry.

We have been able to give but a bare enumeration of the nature of the collection. This is as yet in an incomplete state, owing to the time required in obtaining and arranging specimens, and analyzing products, as well as from the fittings not being yet complete. But we shall return to the subject when the collection is in a more advanced state. The ideas, plans, and development are highly creditable to Dr. Playfair's comprehensive genius; and while these will prove of great public importance in diffusing useful information, they will also add to his already well-established reputation as an eminent chemist.

ORIGIN OF THE DUCHESS FAMILY.

SIR,—I believe I can supply some facts respecting the origin of the first cow recorded in the Duchess pedigree, alluded to by your correspondent DUNELMENSIS, in his interesting letter of the 19th, which not being generally known, may interest your readers. Your correspondent says: "We are not aware whether the cow by Mr. J. Brown's red bull was purchased or bred by him. (I imagine from the context that your correspondent here alludes to Mr. Colling.) Assuming the former to be the case, which we believe, she belongs to the class of cows having pedigrees when he bought her; though of whom he did so, we are also ignorant."

I have in my possession a catalogue of a sale of shorthorns, belonging to Mr. George Vail, of Troy, U. S., to which, in addition to the usual particulars, that gentleman enters into details respecting the mode in which he first acquired the originals which he imported from England. These were Duke of Wellington, roan bull, bred by F. Bates, Esq., by Short Tail (2621), dam Oxford premium cow, &c.; and Duchess, white heifer, also bred by Mr. Bates, got by Duke of Northumberland (1940), dam Nonsuch the Second, by Belvidere (1706), &c. He then appends the following interesting account of the origin of the Duchess family, which, as will be seen, purports to be given by Mr. Bates himself. Mr. Bates bases the superiority of his shorthorn cattle upon the merits of what he terms his "Duchess tribe," and in his communication to the publishers, of his premium bull, Duke of Northumberland, he remarks, "The whole of this family of shorthorns are alone in my possession, having purchased my original cow of this tribe, of the late Charles Colling, Esq., of Ketton, near Darlington, thirty-five years ago. They had been in the possession of Mr. Colling twenty years, who purchased his original cow of the agent of the late Duke of Northumberland, and called her Duchess (which is the reason I have named the bull after that family), as they are justly entitled to be held in commemoration for having possessed a tribe of cattle which Mr. C. Colling repeatedly assured me was the best he ever had, or ever saw, and that he never was able to improve upon her, although put to his best bulls; and I have undoubted information from the best authority for saying that this tribe of Shorthorns were in the possession of the ancestors of the present Duke for two centuries; and that Sir Hugh Smythson, the grandfather of the present Duke, kept up the celebrity of this tribe of cattle by paying the utmost attention to their breeding, and that he used regularly to weigh his cattle, and the food they ate, so as to ascertain the improvement they made in proportion to the food they consumed."

Respecting the authenticity of the foregoing, I need only remark that the name of Mr. Vail, appended to the entire document from which it is extracted, appears to be a sufficient guarantee. The date of the handbill is May 14th, 1849.

The Duchess family would thus appear to have been bred with care at a period considerably antecedent to that usually assigned as the origin of the improved Shorthorns. More is known of its origin than is the case with most others, even of the most celebrated originals of the race. We also find that Mr. Colling expressed a high opinion of this family at a period long antecedent to that of their being crossed with Belvidere. Indeed, the very considerable price which Mr. Bates paid for the Duchess which he bought at Mr. Colling's sale, affords a strong presumption that she can have been no ordinary heifer. Of course, in speaking of events which occurred long before my own recollection, I am dependent upon the evidence of others. Subject to this proviso, then, I may state that I have it upon the authority of one who well knew the Duchesses in early days, that as a family they always possessed the high quality which characterises them at the present day. My informant, however, adds that the cross with Belvidere appeared to impart to them a character of majesty, strongly exemplified in the Duke of Northumberland, which now seems as peculiarly to distinguish the bulls as refinement does the cows. At all events, this, like every other important cross to which Mr. Bates resorted, has been stamped with the approval of the public, including the remarkable one with the blood of the Matchem cow. Not only have both bulls and cows of the Duchess family realized prizes, which taken one with another may be termed unprecedented, but other animals have by means of a few crosses of this blood, in spite of short pedigrees, been sold for more money than best blood of other families was apt to command Thus, at Mr. Tanqueray's sale in 1855, three cows and a bull of the Oxford family (descendants of the Matchem cow) realized 1,100 guineas. Yet the pedigree of this family is not traced further back than Young Wynyard (2859). Is this preference for Mr. Bates' blood, and especially that of the Duchess tribe, a mere caprice on the part of the public, or is it founded on reason?

As far as I am competent to form an opinion, I certainly think the Duchess tribe possess in an eminent degree those qualities which are desirable in improved cattle. Indeed, when the buyers of the world are congregated together, it will generally be found that their judgment is right. The question then arises, wherein the peculiar merit of Mr. Bates' stock consists? Mr. Bates required a short-horn to present a *union* of good qualities, instead of, like too many breeders, developing one or two points out of all proportion, while sacrificing others equally valuable. Beginning with the Duchess heifer, he endeavoured to establish a family, every member of which should as nearly as possible approach the type of a true short-horn. That they possessed both symmetry and early maturity, is attested by the numerous premiums which they won at the meetings of the Royal and other agricultural societies. The Rev. H. Berry mentions the Duchess tribe along with that of Daisy, as remarkable for their milking powers. Mr. Bates, however, soon arrived at the conviction that the degree of forcing which is necessary to command success in the show-yard, is highly prejudicial to a breeding herd; and he consequently discontinued the public exhibition of his stock. It is possible that the fine quality for which his herd and its descendants are remarkable may be in part owing to his judicious treatment, in keeping his stock generously without forcing it unduly. Since his death, and its consequent dispersion, its value has rather increased than otherwise, as witness the marvellous Tortworth sale, and that of Mr. Tanqueray. In public competition, too, this blood has been eminently successful, whether in conjunction with other blood, like Mr. Ambler's Grand Turk, or unalloyed like Lord Feversham's Duke of Oxford.

I should be sorry if it were to be imagined from what I have just written, that I am so bigoted an admirer of the Duchess blood as to be insensible to the merits of any other. I am sure that all who are acquainted with my writings will bear witness that I have never hesitated to commend whatever strain of good blood has been brought under my notice. I hold it, indeed, to be a besetting weakness of breeders to persuade themselves that all blood is worthless except that which they themselves possess. Singularly enough, too, the more decided success a man has achieved, the stronger is his temptation to follow this delusion. It is after he has attained his idea in practice, that the danger besets him of being so satisfied with what he has accomplished, as to imagine that further exertion is unnecessary. He is too apt to forget that the very eagerness with which he has cultivated certain favourite points, has led him to pay less attention to others no less essential. It is thus that deficiencies become no less stereotyped in certain strains of blood than their merits. However trying, therefore, it may be to the feelings of a breeder to resort to other blood, whoever wishes to maintain his stock at the highest pitch of excellence, must from time to time have recourse to a cross as far removed from his own as is compatible with purity. There is no difficulty in making a selection from the numerous families which are descended from the times of Colling and his contemporaries. And the letters of *Dunelmensis* afford much useful information to those who desire to become acquainted with the annals of those early days.

In another respect your correspondent is doing good service, viz., in stating the real facts of the case with regard to the origin of the improved shorthorns. It is important that it should be generally known that long before the time of the breeders contemporary with Charles Colling, who have now attained world-wide celebrity, there was an excellent breed of cattle in existence in Durham and considerable districts of Yorkshire. It is important to have the authority of your correspondent in support of the fact that selection from the materials around them was the principal foundation on which the wonderful fabric of the shorthorn race has been reared. It is satisfactory to know that they are not, as has been sometimes affirmed by parties ignorant of those districts, an artificial product, patched up by the forced union of many incompatible races. That Mr. Colling did introduce into part of his stock a cross with the Galloway cow is well known to every person even moderately versed in the history of his proceedings. If there had been any doubt upon the subject, it has long since been set at rest by the inquiry which the late Lord Spencer caused to be made among the papers of that eminent breeder. But although an incident like this strikes the imagination of persons not practically versed in breeding, and is admirably suited to the purposes of bookmakers who copy it from each other, to the neglect of more important matters, it is absurd to attribute to this cross the origin of the improved shorthorns. No one can read an authentic account of the manner in which Mr. Colling introduced the foreign blood, without being struck with the judiciously sparing measure in which he used it. Permanent excellence in a breed was never yet attained by the crude union of incompatible qualities. It is only to be looked for from the judicious selection of individuals characterized by those properties which we desire to perpetuate.

I am yours, &c.,

Holly Bank, April 26. WILLOUGHBY WOOD.

THE FATE OF THE STATISTICS BILL.

We are inclined to believe that Mr. Caird really meant well with his Agricultural Statistics Bill. It read, moreover, as a measure framed in all moderation, and calculated to work easily with those to whom it was intended to apply. Unfortunately, however, the proposition came from the wrong quarter. There was a Doctor Fell feeling about its introduction that it was not very difficult to understand. It is not so very long since the honourable Member for Dartmouth was in something like open antagonism with the general body of agriculturists. As the model Free-trade farmer and special Commissioner, the Country party may have thought they had little to thank him for. He is going to put some more cross questions, and will be trying to show us up again, no doubt.

The signal defeat of the Statistics Bill must be in a great degree attributable to this. Of the bill itself, we repeat, there is very little to complain; and on its own merits, we confess, we do not see why such a plan should encounter more opposition in England than it has done in Scotland or Ireland. But it was made a party question. The representatives, indeed, of the agricultural interest appear to feel far more acutely in the matter than the agriculturists themselves. Even the leader of this opposition, Mr. Packe, is subject to continual correction when he touches upon the subject in his own county. Almost the only practical farmer examined before the Lords' Committee spoke directly in favour of the collection of these statistics, while Mr. Bankes Stanhope, who represents him in Parliament, is as decidedly against them. Mr. Ball, again, the member for Cambridgeshire, will not have such a system on any terms, while some of the warmest of his supporters stand committed to its advocacy. Still, even the landlords do not all pull together here. There is, perhaps, no man in the House who takes a greater interest in the cause, or who understands the farmers better, than does Mr. Miles, the member for Somersetshire. We can all remember how excellent a President he made of the Royal Agricultural Society. Mr. Miles voted for Mr. Caird's Bill. "He was astonished that it should have met with so much opposition. He was in possession of facts which proved that the agricultural interest did not offer the slightest objection to making returns, so long as they did not interfere with produce and stock." Mr. Caird did not propose to interfere with produce or stock. Then, Mr. Henley is in favour of what he calls "pure statistics"—of the acreage, that is—"the only thing that is really valuable." Mr. Caird asked for no more. These, be it borne in mind, are two leading members of the Conservative cause; both with high characters in their own homes as good landlords, and both with a sound and practical knowledge of the question. They may differ in some minor matters of detail; but, as far as the object and the principle is concerned, they go thoroughly with Mr. Caird.

Now, had Mr. Miles or Mr. Henley introduced this measure, we cannot help thinking it would have met with a very different fate. Let us remember, and take example from what has been already accomplished in this way. What was the great secret of success in Scotland? Simply the fact of the point being put to the farmers by those they knew and could trust in. It is absurd to suppose the system, if only properly introduced, would not work as well here. When we knew already that on the first time of asking so 'cute a constituency as the Yorkshiremen, ninety-nine out of a hundred, filled up the returns, it is idle to question the practicability of such a plan. But unfortunately our own national Society would not make the effort. That terrible "Charter" once more stood in the way. Still, any known man might have done it. We give Mr. Caird every credit for his intention. His work, in short, speaks for itself. He must know, however, that his name is scarcely palatable in a certain quarter; and that, perhaps, few in the House would tell less favourably when taking a lead in rural affairs.

In a somewhat lengthy discussion which ensued on the motion for this second reading, there was in reality very little advanced against the principle. Mr. Packe seemed to think the farmer is the only man asked for this kind of information; whereas there is scarcely a calling but has to give it. In almost every branch of trade returns are made. The stocks of sugar, tea, and other articles, are exactly known; as well as what is on shipboard, and what is to be expected. Agents are sent to America to traverse the cotton producing districts, and make estimates of the growing crop. A shipowner states the number of his ships, and their tonnage—what he gave for them, and what he may have borrowed on them. But no government thinks of these returns singly and separately. It is the gross amount that is required. Besides, is there any business in which the individual detail is so easily known as the farmer's? Would a landlord or agent go to the acreage return to know what the tenant is doing? And, does not the village parliament make out its own return week by week, and year by year? What I have in wheat, you in beans, and he in barley. "When," says Sir Cornewall Lewis, "this question was first brought forward in this House it was met by several hon. members—as it has been by some hon. gentlemen who have spoken to-day—with objections which I cannot help characterising as partaking of the nature of prejudice and clamour; I allude to those objections founded upon the alleged inquisitorial visitations to which a system of agricultural statistics would give rise, and the compulsory means of information to which, under its operation, it would be necessary to resort. When this question was first mooted a general impression prevailed among the farmers of the country that it was intended to devise some new means of taxing, or of enabling their landlords to raise their rents. Their fears upon these points, however, appear to me to be wholly chimerical and illusory. Nobody can demonstrate how the Government would be provided with an additional means of taxation by obtaining this statistical information; nor does it seem to me that the landlords can fairly be supposed to have that very imperfect knowledge of their own estates which would render it probable that the meagre and unsatisfactory returns which we might hope to obtain in reference to agriculture would place them in a different position, so far as the question of raising their rents is concerned, from that in which they now stand. I cannot help thinking, therefore, that the fears to which I have referred are wholly unfounded; and my experience tends to convince me that they are now very much dissipated, and are not shared in by the more intelligent members of the agricultural classes."

Again, can any one imagine such a plea against the collection of statistics as that offered by Mr. Drummond?—That this was information only useful for the corn-dealer, and that the farmer should not be encouraged to hold back or sell, but be left to dispose of his produce as his necessities required! The answer to so manifest an injustice is self-evident; but it was well put by Mr. Cardwell:—"He held a higher opinion of the farmer than his hon. friend, who thought he must only conduct his business on the hand-to-mouth principle, and only go into the market to sell his produce under the immediate pressure of necessity. Pursue that train of reflection, and they would see that the British farmer was of all others the most interested in the collection of agricultural statistics. The persons with whom he made his bargain usually conducted their business on a great scale, but the farmer had only the produce of his own farm to sell, and could have little or no knowledge to guide him except that which the Legislature might afford him. If, as they had just heard, a large purchaser of barley (Mr. Bass) could tell them that it would be of the greatest interest to him, in his trade, to have a collection of agricultural statistics; if, with all his means and intelligence, he would be glad to have such information as he had referred to, how much more glad would be the farmer who dealt with him?"

Mr. Du Cane quoted evidence to show how impossible it was to make anything like an accurate estimate of the yield—which we entirely agree with; *only* the Bill before the House did not ask for such an estimate! So good a man as Mr. Ker Seymer had to content himself with such mild pleasantry as this (he is speaking for his tenant):—"I am busy growing corn; you ask me to fill up schedules; I would rather grow my corn, if you please." And Mr. Bentinck thought the effect of the Bill would be to encourage a vicious spirit of speculation amongst the farmers. Mr. Henley, while admitting the principle, made endless objection to the details of the plan by which this information is to be obtained. We are by no means ready to pass the machinery of the proposed Bill as anything like perfection. Sufficient, however, has already been done, even in England, to show that many of the obstacles the right honourable the President of the Board of Trade would raise are hardly worth consideration. Nothing is so easy as to anticipate such difficulties; but they smack here chiefly of red tape, and "how not to do it."

A far more important point is, what these returns would be worth when obtained? Would they justify the expense of making them, either to the producer, the people, or the Government? In answer to this we have already evidence as to how interesting and useful they have been in demonstrating the improvement of Ireland. They were working on to the same end in Scotland. That their collection here would be followed by any immediate sign or effect we much doubt; but that they would gradually be developed into a very serviceable guide and test of our condition we doubt very little. We believe, moreover, that such information might, if only judiciously worked, be had at little trouble and expense. The farmer himself has in a great measure outlived his prejudice; while the experience of his brethren over the Border and across the Channel will assure him how little there is in reality to fear.

THE PESTS OF AGRICULTURE.

Of the many subjects possessing a primary interest to the agriculturist, certainly the depredations committed upon his crops and produce by insects and vermin are not the least important; nor is the consideration of this matter alone of interest to the farmer. Every individual, here or elsewhere, is at times the prey of bloodthirsty vermin—a safeguard against whose voracious attacks would be considered a veritable boon both to individuals and to society at large. Bipeds and quadrupeds, animals and vegetables--all have their predatory enemies and parasites, for which, despite the "*catch-'em-alive-o*" fly-papers, the insect-destroying powders, and other alleged specifics, we have as yet no remedy. Many of the plagues of Egypt are still permitted to annoy our persons and destroy our crops.

Although at home wasps and flies are occasionally sad tormentors, and the blood-sucking pests of our lodging-houses and dwellings leave unpleasant reminiscences behind, it is only those who have seen animal life in all its profusion in the tropics who know the intense horrors and inconveniences of insect pests. There swarm mosquitoes, buffalo gnats, small black flies, horse-flies, minute sand-flies, flights of locusts, chigoes depositing their nidus in the flesh, the guinea-worm tormenting one by getting under the skin. Rest is banished during the sultry hours, for the human subject; while cattle, horses, and domestic animals generally are worried so that they can neither feed nor rest. Flies get entry into your mouth, into your eyes, into your nose. You eat flies, drink flies, and breathe flies. Lizards, centipedes, cockroaches, and snakes get into the bed; ants eat up the books; scorpions sting you on the foot. Everything bites, stings, or bruises; every second of your existence you are wounded by some piece of animal life that is new to you. An insect with eleven legs is swimming in your teacup; a nondescript with nine wings is struggling in your beer; or a caterpillar with several dozen eyes in his belly is hastening over the bread. All nature is alive, and seems to be gathering all her entomological hosts to eat you up, as you are standing out of your coat, waistcoat, and breeches. Such are the tropics. Even in parts of North America, a resident tells us—"If you would sleep on a sweltering night in June, nothing short of chloroform will render a novice insensible to the melody of those swamp serenaders, the musquitoes, or the tactics of their bloodthirsty ally, the black fly, who noiselessly fastens upon your jugular, while the musquito is bragging in your face. Two remedies are at your service, either of which some persons will be found captious enough to consider worse than the disease. The first cure is the one applied to hams—smoke yourself until your eyes are like burned holes in a blanket, and you have creosote enough in your mouth to cure a toothache. The second is to smear all your assailable parts with Canadian balsam, until, after a night's tossing in your blanket, you have wool enough on your face and hands to make you look, as well as feel, decidedly sheepish."

It is, however, with the pests of agriculture that we are specially interested, and to which we would direct attention. Here is a subject to which the Royal Agricultural Society might well devote itself, by bringing to bear on it the more extended practical observations of the farmers and the investigating skill of scientific men. Too little has yet been done on a broad scale in this direction. Entomologists have taken up occasionally the investigation of one or other of the predatory insects; but there are few collected details, or scientific examinations. With the exception of Kollar's work on Insects injurious to Agriculture, and Mr. Curtis's essays (there is one very excellent one in the last volume of the Journal), we do not know of any special treatise that enters into detail on this important matter fraught with such larger interests and high importance. Among the officers belonging to the Royal Agricultural Society, we do not find, as in the New York and Paris societies, an entomologist, and yet the agricultural crops of various kinds are even of a higher importance than the live stock. If we have a veterinary professor for the one, surely the ravages committed by insects on the other demand the supervision and scientific examination of an entomologist to point out the habits of the insects, characteristics, and remedies.

The American Legislature votes £200 a-year to promote the investigations of Dr. Asa Fitch, Entomologist of the New York State Agricultural Society. A most useful collection of insects hurtful to agriculture has been formed under his supervision, and much useful information obtained and promulgated. M. Edwards, the administrator and curator of the Collection of Entomology at Paris, recently sent over to the New York society a collection of the predatory insects from Algiers. In parts of Canada and the United States great ravages are occasionally committed by three distinct insects destructive to the wheat crops, which in name, at least, are often confounded—the Hessian fly (*Cecidomya destructor*), the weevil, *Calandra granans*), and the wheat midge, or wheat gnat (*Cecidomya tritici*). Almost every local society abroad is doing something in this direction; but their labours want collecting, to be of general use. The Agricultural Board of Canada recently devoted £80 in premiums for the best essays on the origin, nature, habits, history of the progress from time to time, and the causes of the insects, which ravaged the wheat crops. The South Australian and other agricultural societies have all moved in the same direction. To understand in their true extent the depredations of insects, we must not, as Mr. Spence observed some years ago, confine our attention to the hundreds of thousands of pounds which we annually lose from the attacks of the hop-fly, turnip-flies, the wire-worm, the weevil, and the host of insect assailants of our home agricultural and horticultural produce, but we must extend our views to the colonies and foreign countries. We shall then find that in Australia and British North America the potato crops are often, in some quarters, wholly cut off by the potato bug; that in the West and East Indies the cocoanut trees are the prey of a boring insect; that the cotton crops of India and America are frequently seriously injured by insects of various tribes, whose history we have yet to learn; that in Ceylon the coffee-bug commits sad depredations on the trees; that in the Straits settlements the spice-trees are much subject to the attacks of certain species of cocci; while in Africa whole tracts of country are devastated by swarms of locusts, although these are greedily seized on, in turn, as food by the natives. It would therefore seem that the vegetable world has plagues far greater than ever Moses inflicted on the inhabitants of Egypt.

We see, then, that insects are the most numerous, as well as the most destructive, foes to which the agriculturist is exposed.

As Loudon observed long ago, their species are so many, and their devastation so varied, that, without some acquaintance with their scientific classification, and a correct knowledge of their haunts and economy, their operations can neither be understood nor effectually counteracted.

What we desire to see is some good collection of insects, &c., and their injurious effects shown, which shall be available for reference both by the scientific man and by the farmer, gardener, and tropical cultivator. At present we have nothing of this kind on a respectable or useful scale. The Entomological Society's operations are extended to all classes of insects, and not specially directed to those injurious to agriculture. At Kew Sir W. Hooker has introduced to some small extent the insects which prey upon trees, &c , and the effects and diseases are partially shown.

Dr. Lyon Playfair, we believe, contemplates collecting, and exhibiting in the Food Department at the South Kensington Museum, specimens of the insects injurious to animal and vegetable products. But while these are auxiliary steps in the right direction, we should like to see a more concentrated course of action, and special and continued attention given to this matter by the Royal Agricultural Society.

Let that body put itself in communication with the provincial, colonial, and foreign societies, and solicit their aid in replying to queries and furnishing specimens; and contributions of a very valuable character would soon be amassed, which, when arranged, compared, and described by a competent entomologist, would result in large practical benefit, not only to our own country, but to the world at large.

We have hitherto stood high in our science and practice in all departments of agriculture; let it not, therefore, be a reflection on us that other countries are more energetic in this minor, but very important, matter. No one can fully estimate the heavy periodical losses inflicted on cultivators, in gardens, fields, and plantations, by the insect pests to which we have alluded.

ROYAL DUBLIN SOCIETY.

SPRING CATTLE SHOW.

This meeting took place under very favourable auspices on Tuesday, Wednesday, Thursday, and Friday, April 27, 28, and 29. It was pronounced to be one of the best exhibitions of stock ever seen here. The Shorthorns came out very strong, and were beyond all praise—184 yearling bulls. We subjoin the list of prizes, and though, generally speaking, these were well awarded, they as usual did not properly distinguish between fat and good store condition. Mr. Douglass' bull and heifer were perfect animals, but we much doubt if they will ever be very large. Mr. Barnes' yearling bull was not so fat, but a beautiful even beast, and sold at a very large sum, though not named by the judges. Many of the best judges pronounced Mr. Christy's two-year-old bull superior to Master Butterfly: he will be sold for a large sum. Lord Clarina had a nice heifer, but only in store condition: Mr. Massy refused 70 guineas again and again for her. Mr. Turner's cow was as near perfect as anything ever seen. Lord Waterford bought her and her fellow for a great sum. The beauty of the Shorthorn stock was the common talk. The half-bred class shows their value as a cross—they are noble animals, of vast size and weight. The long-woolled sheep were largely represented, but not of very great merit; although Mr. Thunder's Leicesters were of fine quality. Mr. Beale Brown's ram lambs were of large size, constituting a portion of 70 of those, we understand, he has challenged the world with for a thousand pounds. Mr. King Harman's ram was a very even animal. The pigs were well represented, and, as usual, very good.

His Excellency the Lord Lieutenant, in a very good practical speech delivered at the evening meeting of the Society, thus touched on the merits of the show:—"I believe, without flattery, it is a show equal to, if not surpassing, any show of the sort which has taken place in England or Scotland. As regards the class of shorthorns, I am informed—and certainly my recollection bears me out in all the shows I have ever seen—that in Ireland this is the largest and best show that has ever taken place; and certainly I can confirm it as regards my own experience even in other countries. On looking at the animals which I had the satisfaction of witnessing to-day, I confess that I never have yet seen anything which gave me greater pleasure than the heifer belonging to Mr. Douglas—I believe as perfect an animal as ever has been shown at any agricultural meeting; and I am sure even an assemblage of Irishmen may pardon me if, following out Lord Clancarty's views, I do take a little national pleasure to myself, that that animal was accorded the first prize. Mr. Douglas has also carried off so many prizes that I will not go on with them too long; but I now come—I will not say with greater pleasure, but with more satisfaction to this company—to the Kerries. The Kerry cattle have long been the greatest possible favourites of mine. I think they are—if I may use the term—the thorough-breds of cattle. To my mind they are the most beautiful cattle I know. I saw some beautiful specimens of them to-day, and I believe it is as good an exhibition of this description of cattle as I have ever seen, and I admired them probably as much as any of you; and certainly in that respect no feeling of nationality came in my way. I also admired with feelings of partly pleasure and partly regret, the small stock of Devons, to which were accorded the prize, belonging to Lord Charlemont. I believe if there are any persons present who were present six years ago—I am afraid six years make a great difference—they will remember that I gave great praise to the pigs. It appears that during these six years the pigs have certainly improved. I do not think it possible to see a finer show, though I will not go the length of one of the stewards with respect to their private excellence, their domestic qualities, and their talents (laughter); but I admired them excessively. The only thing that gave me some degree of dissatisfaction was that there was not so large a show of Ayrshire cattle as I should have wished to have seen from my own country. What I saw were good, but I sincerely wish that the inhabitants of my country would pay more attention to your shows. It gives me great pleasure to see the progress that the Royal Dublin Society has made during the time I have been away."

THE PRIZE LIST.

JUDGES.

Short-horns.—Wm. Sanday, Holme Pierre Point; Mark S. Stewart, Southwick, Dumfries; Henry Croker, Croom.

Mixed Breeds and Fat Stock.—Samuel Garnett, Robert W. White, C. G. Grey.

Sheep.—Thomas Twitchell, Wellington, near Bedford; Captain Ball, Caleb Going.

Swine.—Captain Edward Croker, Captain Arbuthnot, Henry Thurnall, Royston, Herts.

BULLS.

Short-horns calved in 1857.—First prize, 5 sovs., James

Douglas, Athelstaneford; second prize, Charles L. Ellison, 3 sovs.; third prize, Richard Featherstonehaugh, large silver medal.

Calved in 1856.—First prize, John Christy, 5 sovs.; second prize, Viscount Monk, 3 sovs.

Calved in 1855.—First prize, Lord Talbot de Malahide, 5 sovs.; second prize, George Roe, 2 sovs.

Herefords calved in 1855.—The prize £3, Allen Pollock (no competition).

Devons calved in 1856.—First prize, £3, to the Earl of Charlemont (no competition).

Calved in 1855.—Prize of £3 to same.

Best West Highland bull, of any age, Lady Pigot, large silver medal.

Best Scotch Polled bull, Lord Talbot de Malahide.

Best Ayrshire bull, Wm. Boyle, large silver medal.

Best Alderney bull, Henry M. Barton, large silver medal.

Best Kerry bull, Sir Edward M'Donnel, large silver medal.

Best bull of any breed, calved prior to 1855, Ambrose Bole, large silver medal. Second best, Nathaniel Barton, small silver medal.

Best of all the prize bulls, James Douglas, the gold medal. Second best, John Christy, large silver medal.

COWS AND HEIFERS.

Short-horned.—Best heifer, calved in 1857, Thomas Ball, large silver medal; second best, Thomas Barnes, small silver medal.

Best heifer, calved in 1856, in calf, or producing a live calf within twelve months subsequent to the 18th of April, 1858, James Douglas, large silver medal; second best, James Douglas, small silver medal.

Best heifer, calved in 1855, giving milk, or in calf, John J. Turner, large silver medal; second best, Wm. Owen, small silver medal.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 18th of April, 1858, Lady Pigot, large silver medal; second best, J. J. Turner, small silver medal.

Hereford.—Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 13th of April, 1858, Allan Pollok, large silver medal.

Devon.—Best heifer, calved in 1857, Earl of Charlemont, large silver medal.

Best heifer, calved in 1856, in calf or producing a live calf within twelve months subsequent to the 14th of April, 1858, Charles Toole, large silver medal.

Best heifer, calved in 1855, giving milk, or in calf, Earl of Charlemont, large silver medal.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 18th of April, 1858, Earl of Charlemont, large silver medal.

West Highland.—Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 18th of April, 1858, C. L. Ellison, large silver medal.

Scotch Polled.—Best heifer, calved in 1857, Lord Talbot de Malahide, large silver medal.

Best heifer, calved in 1855, giving milk, or in calf, Lord Talbot de Malahide, large silver medal.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 13th of April, 1858, Lord Talbot de Malahide, large silver medal.

Ayrshire.—Best heifer, calved in 1857, William Boyle, large silver medal.

Best cow, of any age, in calf or having had a live calf within twelve months preceding the 18th of April, 1858, Wm. Boyle, large silver medal.

Alderney.—Best heifer, calved in 1857, Jas. B. Kennedy, large silver medal.

Best heifer, calved in 1855, giving milk or in calf, James B. Kennedy, large silver medal.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 18th of April, 1858, Colonel Hill, large silver medal.

Kerry.—Best heifer, calved in 1857, Sir E. M'Donnel, large silver medal.

Best heifer, calved in 1855, giving milk or in calf, Hon. R. G. Talbot, large silver medal.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the 18th of April, 1858, Sir E. M'Donnel, large silver medal.

Best of all the prize breeding heifers, giving milk or in calf, James Douglas, the gold medal.

Best of all the prize milch cows, Lady Pigot, the gold medal.

Best three milch cows, in calf, or having had live calves within twelve months preceding the 18th of April, 1858, and *bona fide* the property of exhibitor, J. J. Turner, the gold medal.

The *Irish Farmer's Gazette* Plate, value £155—James Douglas, Athelstaneford, Drew, N.B., for his short-horned heifer Venus de Medicis.

FAT OXEN.

Shorthorned.—Best fat ox, calved prior to 1855, Nathaniel Barton, large silver medal.

Hereford.—Best fat ox, calved prior to 1855, Robert Smith, large silver medal.

Devon.—Best fat ox, calved prior to 1855, Earl of Shannon.

Any other Breed.—Best fat ox, calved in 1856, Lord de Freyne, large silver medal.

West Highland.—Best fat ox, calved prior to 1855, David Rogerson, large silver medal.

Kerry.—For the best pair of fat oxen, of any breed, that have been fairly and *bona fide* worked as plough bullocks up to May, 1857, Earl of Shannon, large silver medal.

Best of all the prize oxen, Earl of Shannon, honorary certificate.

FAT COWS OF ANY AGE.

For the best Shorthorned, Nathaniel Barton, large silver medal.

For the best Devon, Earl of Charlemont, large silver medal.

For the best West Highland, John Fetherston, large silver medal.

For the best Kerry, James L. Napier, large silver medal.

For the best of all the prize fat cows, Nathaniel Barton, honorary certificate.

FAT HEIFERS.

For the best fat heifer of any breed, Nathaniel Barton, large silver medal; for the second best, P. J. Kearney, small silver medal.

SHEEP.

Leicesters.—For the best one-shear ram, George Thunder, three sovereigns.

For the best two-shear ram, same, three sovereigns.

For the best three hogget rams, never clipped, George Thunder, two sovereigns.

For the best five ewes, with their lambs yeaned in 1858, or in lamb, Livingstone Thompson, two sovereigns.

For the best five ewe hoggets, never clipped, William Owen, two sovereigns.

Long-woolled, not qualified to compete as Leicesters.—For the best one-shear ram, Thomas Beale Brown, three sovereigns.

For the best ram of any other age, Edmund Ruck, three sovereigns.

For the best three hogget rams, never clipped, Thomas B. Brown, two sovereigns.

For the best five ewe hoggets, never clipped, Edmund Ruck, two sovereigns.

Short-woolled.—For the best one-shear ram, Charles W. Hamilton, two sovereigns.

For the best ram of any other age, Hon. L. H. King Harman, two sovereigns.

For the best three hogget rams, never clipped, Peter Broughton, two sovereigns.

For the best five ewes, with their lambs yeaned in 1858, or in lamb, Charles Wm. Hamilton, two sovereigns.

For the best five ewe hoggets, never clipped, Charles Wm. Hamilton, two sovereigns.

Cheviots.—For the best one-shear ram, Lord Clermont, two sovereigns.

For the best two-shear ram, Marquis Conyngham, two sovereigns.

For the best ram, of any other age, Lord Clermont, two sovereigns.

For the best three hogget rams, never clipped, Lord Clermont, two sovereigns.

For the five best ewes, with their lambs yeaned in 1858, or in lamb, Marquis Conyngham, two sovereigns.

For the best five ewe hoggets, never clipped, Marquis Conyngham, two sovereigns.

FAT WEDDERS.—For the best pen of five long-wolled fat wedders, not exceeding two shear, Sir Edward M'Donnel, large silver medal.

For the best pen of five short-wool fat wedders, not exceeding two shear, P. Broughton, large silver medal.

For the best pen of five cheviot fat wedders, Lord Clermont, large silver medal.

SWINE.

COLOURED BREEDS.—For the best boar, six months, and not exceeding twelve months old, Wm. Joyce, 3 sovs.; for the second best, Thos. Rutherford, 2 sovs.; for the third best, Lord Charlemont, the honorary certificate.

For the best boar, exceeding twelve and not exceeding twenty-four months old, E. W. Tomkinson, 5 sovs.

For the best boar, exceeding twenty-four months old, Arthur D. Chaigneau, 5 sovs.; for the second best, Robert Collins, M.D., 3 sovs.

For the best breeding sow in-pig, or having had a litter within six months, Captain F. Adey, 3 sovs.; for the second best, Major H. M'Clintock, 2 sovs.; for the third best, Capel F. Adey, the honorary certificate.

For the best three breeding pigs of the same litter, under ten months, A. D. Chaigneau, 3 sovs.; for the second best, Joseph Radcliffe, L.L.D., 2 sovs.; for the third best, C. P. Leslie, M.P., the honorary certificate.

For the best litter of pigs, not exceeding five months old, accompanied by the sow, Robert Collins, M.D., 3 sovs.; for the second best, J. C. Metge, 2 sovs.

WHITE BREEDS.—For the best boar, six months, and not exceeding twelve months old, Lord Lurgan, 3 sovs.; for the second best, Charles L. Ellison, 2 sovs.; for the third best, Hans H. Woods, the honorary certificate.

For the best boar, exceeding twelve months, and not exceeding twenty-four months old, John H. Peart, 5 sovs.; for the second best, Wm. Boyle, 3 sovs.; for the third best, George Mangles, the honorary certificate.

For the best boar, exceeding twenty-four months old, Lord Lurgan, 5 sovs.; for the second best, Wm. Boyle, 3 sovs.

For the best breeding sow, in-pig, or having a litter within six months, J. L. W. Naper, 3 sovs.; for the second best, Wm. Boyle, 2 sovs.; for the third best, Robert W. White, the honorary certificate.

For the best three breeding pigs of the same litter, under ten months old, Charles L. Ellison, 3 sovs.; for the second best, James L. W. Naper, 2 sovs.; for the third best, Lord Lurgan, the honorary certificate.

HIGHLY COMMENDED.

BULLS.—J. Richardson, W. Coppinger, Lord Lurgan (2) W. B. C. Roberts, J. Barcroft, Major H. S. M'Clintock.

COWS AND HEIFERS.—Lord Lurgan, J. Barcroft, R. Campion, Thomas Barber, J. J. Turner, George Roe, Lord Talbot de Malahide, W. Boyle, Sir E. M'Donnel, R. G. Campion.

FAT STOCK.—Earl of Shannon, David Rogerson, Captain M'Clintock Bunbury, M.P., Sir Robert Paul, Bart., R. S. Fetherstonehaugh.

SHEEP.—William Owen, George Thunder.

SWINE.—Hans H. Woods.

COMMENDED.

BULLS.—Lord Dufferin and Clandeboye, Richard Chaloner, Thomas Barnes, John Christy, Thomas Barber, Hon. Thomas Preston.

COWS AND HEIFERS.—Lord Clarina, Thomas Barnes, Viscount Monk, Richard Welsted.

FAT STOCK.—Nathaniel Barton, R. S. Fetherstonhaugh, Allan Pollok, Earl of Clonmel.

SHEEP.—C. P. Leslie, M.P., William Owen, John La Touche, Ambrose Bole, Richard Byrne, Gustavus W. Lambert, John W. Brown, Lieutenant Colonel Tottenham, Marquis Conyngham, Lord Clermont, P. J. Kearney.

SPARE THE LITTLE BIRDS.

The augmented depredation of insects to which the farmers crops are subjected, amounting to an annual loss in value of millions sterling, and to the extent of nearly one-fourth in produce, renders the study of entomology almost a necessity: for, if without check this evil continues to increase, the day may come sooner than many will believe, when the important agricultural products will be so diminished from this cause alone, as to produce great dearth and suffering, and when many of the best and most valuable fruits will be a rarity, if their production is not rendered impossible. Note, in verification, all the varieties of the plum, gage, nectarine, and cherry fruit, which, from the ravages of the different genera of curculio, or the weevil, are now rare, and seldom come to perfection; and even one species of this destructive insect has lately deposited its eggs in the apple, and even in the peach. If this is to continue without effort at prevention or remedy, how soon may it be hopeless to look for, or even expect again to see, as in the days of old, the various fruit-trees breaking down from the burden of their golden and luscious fruit!

The evil is not done by the perfect insect—many insects never feed after their metamorphosis—but by the boring and deposition of the egg, which soon hatches, and we have a worm, or the larva, ravenous in its appetite, and destructive to anything it comes in contact with. The larva, or worm, does all the mischief by feeding on the fruit, thus destroying its organization; after which, of course, it soon drops to the ground, into which the grub or worm goes, and there hibernates until the ensuing year, when it revivifies, and comes forth the perfect insect at precisely the right time and season "to walk in the footsteps of its predecessors," and cause a greatly increased injury to whatever it deposites its eggs in and its larvæ feed on. The utility of entomological study and examination will be of paramount importance; for, doubtless, a careful inquiry into the habits, peculiarities, and destructiveness, of the various insects that are injurious to the crop, must lead, in many instances, to the discovery of an antidote for their ravages, or remedy for the injury they inflict.

There is evidently a great increase of insects injurious to agricultural production. What is the cause of this? The reason is the greater average mildness of winters, and the great destruction of small birds, snakes, toad frogs, water frogs, terrapins, and ants, which feed on insects. When the winter is very severe, the cold destroys myriads in their hibernating state of inaction, or temporary death. Again, it destroys the eggs, by bursting them, and thus making them unproductive. The acute observer, by the aid of a microscope of only ordinary power, can, after any hard winter, see quantities of the eggs (generally adherent to small twigs) of the butterfly, ruptured and unprolific, from their generating power being destroyed by excessive cold.

But man has a greater friend than even these useful animals. *Insects feed on each other;* for some are predatory, and live on others, which are their natural food. Otherwise if this were not so, every vegetable growth on the surface of the earth, from the multitude of insects, would have long since been destroyed, and all animated beings must have ceased to live. If any doubt this, look at the many varieties of the spider; see the regularity, mathematical precision, and beauty of its web, woven with such art to entrap its destined food. Again the mud-dabbler, a species of wasp; preys on the spider itself, by storing them away in magazines of clay or mud, formed with considerable architectural skill, as food for their larvæ to feed on. Thus has infinite Providence in mercy and goodness placed checks which, apparently inoperative, inefficient, and imperceptible, still with unerring certainty retain within ordinary bounds the unlimited increase of any one species that, from their multitude, might become detrimental or destructive to all created beings.

The most important and useful among birds is the innocent little wren, intended by nature, from the number of its young, often twenty or twenty-five in number, its unceasing industry and perseverance, to be the general scavenger of the larva of the butterfly, on which they and their young feed. Their interminable industry, activity, and the multitude of the larva they destroy, are exemplified in the following experiment: I have attached to my country home a nest of these little birds, near to which stands a paper mulberry tree, from which, with watch in hand, I counted, in twenty-four minutes, forty-two of the larvæ of the butterfly conveyed to the nest by this pair of wrens. What, then, must be the amount destroyed in five weeks—the time it requires to rear their young brood—allowing twelve working hours to the day? It is immense, almost beyond calculation in its consequences. Supposing only one grub in a minute,it will make the destruction of the larvæ by this single pair amount in five weeks to 21,600. What, then, must be the number eaten by a few pairs of this truly useful and melodious little bird, which always seeks refuge near the habitation of man? How worse than cruel, then, their destruction by mischievous boys or sportsmen, who, for lack of legitimate game, often wantonly destroy numbers of this and other species of little birds equally useful.

Unless coercive means be taken to prevent the destruction of such animals as feed on insects, the day is not far distant when failure of the most important agricultural products will arise from the depredations of insects; indeed many fruits and vegetables are now becoming scarce from this cause alone; witness the potato and pumpkin, not exceeded by the sweet potato in flavour and nutriment, and many other valuable vegetables unnecessary now to be mentioned.

The next most useful bird, from its great destruction of insects, is the bull-bat, or, as it is erroneously called, the whippor-will. Their nutriment is gnats of various species, some predatory and others injurious to vegetation; indeed all in the gnat form is grist that comes to their mill, even the tormenting and much dreaded mosquito. From the stomach of one of these birds I took and counted four thousand seven hundred and two gnats, consisting of nine different species—all the varieties I have noted. Besides, I am certain the stomach contained, partly digested, as many more, which from their partial dissolution, it was impossible to enumerate. Taking in view the rapidity of digestion in birds, what myriads must a few of this species destroy in the course of the summer!

The swallow comes next in the category. Observe its complete mechanical adaptation for swift motion. Has the vaunted power of man ever invented a projectile more perfect in shape to surmount the resistanee given by the air to all bodies rapidly moving through it? Observe how this perfect and beautiful little animal skims over river, lake, or plain, apparently in sport, but actually destroying multitudes of insects for food, among others the fabled gallinipper and well known mosquito.

The water-martin is useful by destroying many species of a larger size than the preceding. Again, there are the tom-tit and sap-sucker, heretofore considered to be injurious by the holes they make in the apple-tree: from the erroneous supposition of injury to the tree by making these incisions, numbers have been slaughtered. How fatal a mistake! Notice when the tree is completely bored all over the body, and some of the chief limbs, how thrifty it looks; how large and sound the apple; and how luscious the flavour of the fruit. Observe the trees which have not been visited by these birds—many look skin-bound, fruit small and knotty, taste flat and watery.

What is the rationale of this? Simply that each perforation is made for the extraction of the larvæ of an insect, which, if not removed, would spoil the size and flavour of the fruit, and eventually destroy the tree. What a pity, then, to exterminate so useful an animal! Man often from impulse, without proper consideration, immolates his best friend. Contrary to common belief, I consider the famed locust beneficial to fruit trees, notwithstanding the great outcry about their destructiveness—a fact very easily substantiated if germane to the present matter.

So the more we learn of the intricate minutiæ of creation, the greater our surprise and admiration of the wonderfully wise system of check and countercheck established, where we see animals almost imperceptible, and apparently the most useless and contemptible, performing functions which, to the superficial, would seem incidental and objectless; but the deep observer of nature, scanning everything with a philosophic eye, sees and recognizes in the action of the most insignificant *a necessary link of the chain*, without which the beauty and grandeur of the whole would be marred; rendering it a doubtful problem if creation itself could exist without their agency.—*Diary of a Country Doctor.*

PRESERVATION OF GRAIN FOR FOOD.

In the number of this magazine for October, 1856, and in following numbers, we presented a few remarks on the important subject of drying of grain in the bulk. We now propose to glance at those projects which have for their aim the preservation of the grain after separation from the straw. Our remarks in connection with this subject will be confined chiefly to wheat, that being the most important of the cereals with relation to the food of man, as yielding the largest per-centage of flour in grinding, the loss being only one-fourteenth, while that of oats approaches nearly to one-half, barley coming closer to the standard of wheat, giving nearly six-sevenths of its weight in flour.

That which chiefly influences the preservative power of wheat is the amount of water or moisture it contains. Containing from 12, 14, 16, and in some cases 20 per cent. of moisture, it is in this condition liable to decomposition; and it is only when the per-centage of moisture is reduced to 8 and 10 per cent. that its keeping in good condition can be secured. In certain parts of the continent, where this moisture is greatly reduced in wheat by careful ventilation and drying, it can be kept without injury for lengthened periods, varying from seven to fifty years. But not only is the preservative power of wheat increased by careful drying: it greatly augments the value of the flour obtained from it for bread-making purposes. "It will yield," says a practical miller, "much more flour per bushel, and require about half the machinery to manufacture it, than it otherwise does if not dried. The quality of the flour is improved at least 10 per cent., as by drying the wheat all impurities of a vegetable nature are entirely removed; and by extracting its natural moisture, the flour will consume, when baked, more water than it would before the grain was dried, which makes the bread much more palatable, it being more spongy." The higher, then, the per-centage of moisture in grain, the more difficult is it to keep, and the less valuable is the flour obtained from it. In a warm climate—as that of the United States—in summer, the addition of moisture to grain or flour has a tendency to diminish the quantity of gluten, and to promote such a change in the constitution of its parts as to prevent good baking, or "pannification," as it is termed. An excess of moisture also favours the production of sporules of different kinds of mushrooms, these being developed in the bread which is made from the flour so deteriorated. Professor Dumas states that the wheat of the year 1841, remarkable for its warm summer, exhibited in a high degree this defect. The bread in which these mushrooms were developed was raised in temperature, and soon presented a mass of reddish and disgusting matter. By thoroughly washing the infected grain, and following it promptly by a desiccation or drying, the number of sporules was much diminished. The development of the mushrooms in the bread was, in some measure, prevented by reducing the proportion of water, increasing the quantity of salt, and by increasing the temperature of the oven in which the bread was baked. Seeing, then, the chances of loss and deterioration of value which surround the farmer in the storing of his grain, it is obviously a matter of no mean importance to investigate those plans which have been proposed to preserve it in a condition fitted to produce the largest amount of good bread-producing flour.

The preservation of grain for food-purposes obviously resolves itself into two processes: first, that which gives the grain those qualities which retard or prevent decay; and second, that which tends to preserve or maintain those qualities. The two processes we therefore call the "preparative" and the "preservative."

The main feature of the "preparative" process is the getting rid of the excess of moisture. This drying, or desiccation, as it is termed, may be effected in a vast variety of ways. Perhaps the oldest of all the plans requiring special arrangements—other than those involved in the most ancient of all modes, spreading the grain in the sun-heat—is that introduced by Dr. Stephen Hales in 1743, and held in high repute, according to cotemporary evidence, by the farmers of the time—a curious instance, by the way, of the odd fate which meets many inventions and processes, used to-day and obsolete to-morrow; and that not from better being introduced to supersede them, but from the process which they are designed to aid being quite ignored in succeeding practice. The method adopted by Dr. Stephen Hales was blowing or forcing currents of air through the mass of grain exposed to its influence. A tube perforated with holes was inserted in the centre of the mass, into which the air was blown, pouring through the apertures and permeating the material. The farmers of the day used a modification of this plan by taking a reed or cane perforated with numerous holes throughout its length, placing it in the centre of the grain retained in a sack, and blowing, by means of a common bellows, quantities of atmospheric air through it. In the "Gentleman's Magazine," a statement is given which shows that the plan was in use in France. A member of the Academy of Sciences, M. Hamel de Monceau, having preserved a large heap of corn free from weevils for two years without turning, by merely blowing air through it. If we preserve the blowing feature, and substitute hot air for that having the ordinary atmospheric temperature, we increase the desiccating or drying properties, and arrive at a process of recent invention, which assuredly takes its place as one of the most efficient, if not the most efficient, of all plans for preserving vegetable substances. We allude to the desiccating process patented by Messrs. Robert Davison and William Symington, of London. This plan may be briefly described. A series of cast-iron pipes are arched over a furnace, through which, by a powerful fan, a current of air is forced. The high temperature of the pipes heats the air. The material to be dried is placed in a chamber, into which the heated air is forced, passing off, after permeating through the mass, by a ventilation at the top of the chamber. By simple means, the temperature of the air issuing from the pipes over the furnace can be regulated to a great nicety, from a heat capable of melting lead, to that of the summer's softest gale. The drying power of the apparatus will be best proved by the statement of a fact or two gathered from the experience of those who have used it for wood-drying purposes. "A saw-maker, of well-known reputation in London, sent to be seasoned a piece of rich beech, of which saw-handles are made, and which he would vouch for having been in his possession for twelve years, and during four years of the twelve, it had been lying on the tie-beams of a roof immediately over a smith's forge. From its appearance and sound, this wood would have been pronounced thoroughly dry; yet, after being exposed to a current of heated air at a temperature of 240 degrees, for about two days, it lost 11 per cent. of its weight." A violin, which had been in the possession of a party for sixteen years, its age previous to its coming into his possession not being known, lost on being subjected to the process, in the course of eight hours, as much as 5½ per cent. nearly of its weight. These facts we give as illustrative of the drying powers of currents of heated air.

There can be no doubt that great benefits would arise from some simple apparatus by which currents of heated air could be quickly and economically obtained, to be applied to the drying of grain, either while in conjunction with the straw, or after being separated from it. The chamber for heating the air would be a matter of easy attainment. In nearly all improved farm-buildings, a steam-boiler or steaming apparatus is met with; this will provide the heating-medium. A chamber or steam-chest should then be provided, in which and through which externally, from end to end, or side to side, a series of pipes should be inserted. The steam, being admitted to this chamber, envelopes the peripheries of these pipes, raising their temperature, and that of any air which may be contained in or passed through their interior. Let the openings of all the pipes on one side of the chamber be covered with a hood or external casing, which hood should converge to a single pipe of area nearly equal to the combined area of apertures of pipes passing through the chamber. The same should be done at the other side of the chamber. One of the hood pipes will be that through which the fanners project the air to pass through the pipes: the other will be that which will lead the heated air as it passes from the pipes to the chamber or receptacle in which the grain is placed which is to be subjected to the drying process. In place of steam, air heated in a furnace or by contact with hot surfaces may be used as the drying medium. And instead of pipes, a series of flat chambers placed in zig-zag fashion may be constructed above a furnace or alongside of the steam-engine boiler furnace, and through which air may be blown by a fan, and passed at once into the drying chamber. Further, in addition to the drying of grain detached from the straw by the method here detailed, it is obvious that the plan is applicable to the drying or keeping dry of the grain in the sheaf as stored up in the ordinary stacks; for it is only the addition of a tube well perforated with holes running up the centre of the stack, and through which the heated air can be forced, that is required to make the plan available.

But to return to the drying of grain as detached from the straw: it is clear that the method described, of forcing currents of heated air through *lying masses* of grain, will be most quickly carried out where the bulk of the mass is reduced to a minimum. The economy of the process will be in proportion to the rapidity with which all parts of the mass, and all parts of the individual grains constituting the mass, can be subjected to the action of the currents of heated air. This leads us to the philosophy of the process of drying grain in masses.

If we direct our attention to the simplest of practised methods for drying grain by artificial heat, namely, the kiln, we find that the grain placed *en masse* on the perforated tiles, which form the floor of the chamber, is under circumstances most disadvantageous to its rapid thorough and uniform drying. Placed in a thick layer on the tiles, the moisture evolved from the lower strata has to ascend through, and pass in contact with the strata above; the particles constituting these upper strata necessarily imbibe the moisture thus coming in contact with them; and this before it can be expelled has to be subjected to a temperature which may be too high for the lower strata on which it rests. If, therefore, the heat of the kiln is regulated so as best to dry the stratum or strata immediately subjected to it, that is which lie on the perforated plates, it will be too low to effect as quickly and surely as desirable the upper strata which are in the receipt of the ascending moisture of the lower; or on the contrary, if the heat supplied is of a temperature sufficient to dry the upper strata, it will be too high for the lower. We may thus find in practice different strata of grain under widely different circumstances of drying, thus precluding all chance of attainment of *uniform* drying. True that in practice this uniformity is attempted to be attained by repeated shovelling and turning over of the grain as it lies on the tiles. We say attempted to be attained; for the inherent clumsiness of the process precludes all possibility of perfect adjustment of the so-prepared grain to the peculiar temperature which secures the right degree of drying. From this slight investigation of the circumstances under which kiln-drying is performed, we may deduce as a rule or standard of correct drying the following: "That every individual grain shall have each portion of its surface subjected to the drying influence, and the process so under control that it can be regulated to give the merest shade of surface drying, up to and through all the gradations of scorching and burning." This standard or rule involves two necessities of operation: first, that the temperature shall be easily regulated; and second, that means shall be provided, by which each grain shall have its due share of the heating medium. The reader anxious to have a *resumé* of the plans by which these have been proposed to be attained, may consult an article entitled "A few Notes on Corn drying, and its Advantages to the Practical Agriculturist;" contributed by us to the *Journal of Agriculture*, No. 44, new series. We shall here confine ourselves to the description of one which we consider very efficient as a mechanical means of laying all the grain in contact with the heating surfaces, turning it over and over continuously during the whole of the period in which it is passing through the machine. The invention is founded upon the well-known Archimedean screw, which is frequently used to convey flour from one part of a mill to another. If our reader has witnessed the action of this apparatus, he will have noticed, doubtless, that while the flour is gradually led or moved along from one end of the trough to the other, there is no displacement of its particles from one *side* of the trough to the other; that is, the flour is moved along in one mass, without any disturbance of its material particles. If the reader, however, will imagine a series of plates or ribs, to be placed between the threads of the screw, passing from one to another parallel to the axis, he will easily perceive that as the screw revolved, and each rib came in contact with the flour, it would dig into it, pass it from one side of the trough to the other, and partially lift it up past the centre. Suppose a series of tubes or pipes to be placed in a heating chamber, and each containing an Archimedean screw revolving slowly, and provided with the ribs as above described, one tube communicating with the other by means of shoots or conductors; if the grain to be dried was passed into the upper tube, as it moved along the ribs between the threads it would keep continually lifting it up and dropping it, until it was delivered to the further end of the tube, from which it would drop through a shoot to a second tube, in which it would be subjected to another series of liftings and droppings, till it was delivered to a third tube, and so through a series of seven tubes. It is obvious that every portion of each individual grain would be subjected, not once only, but repeatedly to the action of the heated surface of the tubes through which it passed. In this machine, the invention of Messrs. Robert Davison and James Scott Horrocks, the two necessities involved by the standard or rule of drying already given are met. The regulation of the temperature, or what amounts to the same thing, the degree of drying, is attained by adjusting the number of the tubes through the grain is to pass, and the rate of revolution of the screws which work in them; for the greater the number of the tubes, the more heating surface there will obviously be; and the slower the number of the revolutions of the screws, the less frequently will the grain be lifted up out of contact with the heated surfaces, and the greater therefore will be the amount of drying which they will receive. The second requisite is also met by the means adopted of giving movement to every individual grain as it passes through the tubes. This movement, or lifting up, can be modified in degree, by increasing or decreasing the number of the ribs placed between the threads of the screws.

Having shown how the first, the "preparative" process involved in the "preservation of grain for food purposes" is effected, we now turn to that by which the second or "preservative" is carried out; that is, after having dried our grain, let us see how we are to keep it dry.

The most obvious method to insure our grain being kept dry, after having once made it so, is to store it up in thoroughly dry and vermin-proof granaries; but it is not so obvious that in few cases indeed are granaries, however well built, capable of giving either the dryness or freedom from vermin which the necessities of the case desiderate. To insure these requisites great expense in construction will be necessary, and it is doubtful whether the most complete constructive arrangements can give the freedom from atmospheric agencies of a hurtful kind which is requisite. In the preserved meat tin, in the lead-lined tea-chest of the Chinese, in the housewife's canister, in which is stored up her valuable commodities, in the corn-bin of the stable, moreover, we have an example of what a good wheat-store should be. True, with our preconceived notions of granaries, it is difficult to look upon any plan, in which this principle is carried out, with any other feeling than that of surprise or ridicule. But a very slight consideration will suffice to show that there is nothing difficult of attainment in making air-tight canisters to store wheat up in. On this very subject Mr Bridges Adams—to whose facile pen the scientific world owes many suggestive hints and useful plans—some years ago wrote a paper to show the feasibility of storing up grain in the manner we have hinted at. He says—"There can be no doubt that, if we were to put dry wheat in a hermetically sealed tinned case, it might be kept as long as the famed 'mummy wheat' of Egypt. This will be readily admitted, but the expense would be queried. Let us examine into this. A canister is a metallic reservoir; so is a gasometer, so is an iron water-tank in a ship, at a railway-station, or elsewhere; and a cubic foot of water-tank on a large scale will be found to cost very much less than a cubic foot of canister on a small scale. And if a bushel of wheat be more valuable than a bushel of water, it will clearly pay to put wheat in large canisters of iron. The wheat canister, in short, should be a wrought-iron or cast-metal tank of greater or less size, according to the wants of the owner, whether for the farmer's crop or for the grain-merchant's stock. * * The size of the reservoir should be proportioned to the locality, and it should hold a specified number of quarters, so as to serve as a measure of quantity, and prevent the expense of meterage. * * Granaries of this description would not occupy more than one-third the cubic space of those of the ordinary description, and the cost would be less than one-fifth." Such are some of the advantages of this method of storing up grain, as stated by Mr. Adams. About the same period at which Mr. Adams promulgated this plan, a patent was taken out by Peter Armand le Comte de Fontaine Mereau, in which was claimed a method of storing grain similar in principle. "The invention," as stated in the specification, "consists in the use of closed metallic chambers, serving as tubular granaries or receptacles for the seed, rendered impervious to moisture and atmospheric influence by a covering at top, hermetically closed, affording thereby the means of frequently ascertaining the degree of humidity within. The corn or seed, having an excess of moisture is previously desiccated. These tubular granaries—which may be laid under-ground, or partially or wholly above—consist of a metallic case, preferably constructed of sheet-iron, covered outside with a coat of hydraulic or other cement, and, if necessary, with a coat of preservative varnish. * * The chambers are closed with an iron lid or plug, with a pad of leather, caoutchouc, or gutta-percha introduced between the parts in contact, and by an inner cover adapted to the neck of the chamber, hermetically sealed." A claim is made for the adaptation of examining tubes connected with the lids, and dipping into the interior of the store vessel. Sounding tubes can be inserted into these tubes, so as to bring up and ascertain the condition of the grain at any desired depth.

As applicable to this method of storing grain in separate vessels, and also to the preservation of flour in receptacles, we here notice a method of preventing and retarding decay in accumulated masses of food, which depends, according to the patentee, on very simple principles. "This invention is based upon the theory that in vegetable substances which contain only a small quantity of moisture the process of decay always, or almost invariably the commences at the centre of the mass, and from thence extends in all directions. It is well known to millers and others engaged in the manufacture, storage, and transportation of flour, meal, and grain, that in these substances such is the case, the centre being frequently found soured and heated highly, while those portions near the outside of the mass are uninjured. It is also the case in hay or other substances of a similar nature. In order, therefore, to retard as much as possible the process, the nature of this invention consists in removing the centre of the mass, by placing therein an open tube or tubes, or by the employment of similar means, by which the mass is so distributed that, if decay commences at any point, it must extend to a very great distance in order to affect any considerable portion of the mass, and therefore its progress must be very slow. By thus removing the centre, the mass is also distributed in a body of less than one-half the thickness it would otherwise be; and thus it is believed that the tendency to decay is in a great degree prevented." The name of the patentee is Edward Loradoux Bellford; the date of the patent May 12, 1854.

The principle, if correct, is of easy adoption in practice; it is applicable obviously to corn-bins and corn, or hay-stacks also. In these latter all the advantages of the tubes may be obtained, as suggested by the patentee, by placing a series of poles in the centre, so as to form a tube or ventiduct. There can be little doubt of the efficacy of the plan of a central tube, where air, warmed or otherwise, is forced through it by fanners, as already suggested.

Should any of the methods above described be considered too much out of the range of ordinary practice, and granaries after the methods of our fathers deemed the best, it will certainly be worthy of all consideration whether—in view of the on-all-sides acknowledged benefits derivable from passing currents of air through masses of grain—it will not be, to say the least, a common-sense-like method of proceeding to make some simple arrangements by which currents of air could be brought in contact with grain as it lies on the granary floor. This could, at comparatively small expense, be effected by making the floor double, the upper part of perforated plates or tiles; or, what would be cheaper, constructing a series of channels, at greater or less distances, between the line of joists, with openings tending upwards to the granary, and into this double floor or through these channels, sending currents of air by artificial or natural means. The air passing through the aperture would permeate the mass of superposed grain, and be discharged through the ventilators at the top. In home-stalls or steadings, where stationary engines and fixed thrashing machines are used, the granary being in close contiguity with the apartments in which these apparatus are placed, every facility is fortunately given by which power can be adapted to the forcing of the currents of air through the channels we have described.

With the scientific and practical evidence surrounding us in favour of the value of dried grain for bread-producing purposes, and of its preservative powers, and with a wide choice of plans by which this drying or desiccation can be easily, economically, and perfectly ensured, small excuse can be made for the farmer who complains of having grain, the deterioration of which in value and preservative influences arises from an excess of moisture—the cause, be it here noted, in nine cases out of ten, of the decay of grain. With the aid which the steam-engine—an appliance of nearly every well-conducted farm—gives the agriculturist, a very slight exercise of inventive ingenuity and constructive skill on his part will enable him to improvise some simple mechanism by which he can realise, in some measure, the effect of the summer's heat with the winds of early spring—a combination for the preservation of vegetable substances than which nothing can surpass. R. S. B.

PREMIUMS FOR THE BEST SAMPLES OF BARLEY.—Last year Messrs. Blisards and Godsall offered a prize of a silver cup, of ten guineas' value, to the farmer who should sell them the best sample of Barley, not less than two hundred bushels in quantity. The competition was sharp and close, and the results were so satisfactory, that the firm immediately advanced upon their first attempt, and for the succeeding year offered two cups, upon the same conditions, one to be competed for by growers in the counties of Gloucester, Worcester, and Hereford; and the other by those of Oxford, Wilts, and Berks. The cups were adjudged on Wednesday last, and about fifty samples were shown from the first-named counties, and ten from the other three. The judges, Messrs. Ashby Saunders, brewer, of Cheltenham; W. Turk, maltster, Cheltenham; and W. H. Gillett, corn-merchant, of Swindon, decided that one prize was due to J. Hall, Esq., of Ripple, Worcestershire; and the other to W. T. Hayward, Esq., of Little Whittenham, Berks; and they highly commended the barley shown by Mr. Lane, of Ripple, who won the cup last year. The various competing samples were ranged on Messrs. Blisards' stall in the Corn Exchange, and formed a very great attraction during the hours of business. The event was celebrated by a dinner at the Swan Hotel, which was attended by a great number of the agriculturists and merchants of the neighbourhood, as well as many from a distance.

THE ROYAL AGRICULTURAL SOCIETY.—PROCEEDINGS IN COUNCIL.

The recent proceedings of the Royal Agricultural Society have been of more than usual interest. In addition to the general business of this period—where shall we go? and what shall we do?—there have been two or three special questions to consider. Amongst other matters, the Council have proposed to find becoming successors to such men as Mr. Pusey and Professor Way. They have publicly announced that the Society required a new Editor and a new Chemist.

To only a certain extent have these wants been supplied. The new Editor, in short, is not forthcoming; and the Directorship is still to remain with the Triumvirate. If these gentlemen can devote the time they have hitherto given to the work, we see no reason why they should not continue to conduct it. The late proposition, indeed, by no means ignored their claims or abilities. We take it to be no secret that this was but another reading of the Sibyl's volumes. Instead of the three editors, the charge was to have been confided to one of them, with such assistance as he might require, and at a salary of five hundred a-year. After the question had been twice adjourned, the General Council have refused to sanction this recommendation of their Journal Committee. They have, however, left three hundred per annum at the disposal of the same editorial staff. Tested by the position, tastes, and habits of Mr. Pusey, it may be some time before the one right man turns up.

The solution of their other difficulty has been apparently more readily arrived at. With high recommendations and long experience, Professor Voelcker now reigns in place of Professor Way; and has already read himself into office. It was only, perhaps, when hearing the opening lecture of his successor, that the Society could have felt the peculiar loss of such a man as Mr. Way. As a teacher by word of mouth—stripping science of its technicalities and pedantry—there are few, indeed, equal to him. We never listened to any one more easy to follow, or that so clearly impressed upon his audience those points they should remember. Professor Voelcker, in short, followed close on a well-graced actor, and the comparison was involuntary. We should be the last to damp the spirit of the new comer, but it must be confessed that as a lecturer he has something to learn. It could scarcely be supposed that he has had the experience in this way we know him to have enjoyed in the West of England. As a writer on the chemistry of the farm Professor Voelcker is clear, plain, and forcible; while his brother-chemists all testify to his great professional attainments. As a speaker, on the other hand, he is often rambling and illogical. The first half-hour of his inaugural address on the old hackney common-places of Science and Practice, was unquestionably a mistake. One almost tired of waiting for what he was coming to. While warmly welcoming their present officer, the Society have given their old ally but a cold good-bye. We think, though, this want of expression is more with the Council than the general body of Members. Professor Way was, and deservedly, a very popular man with the farmers; and he will be so still.

There has been plenty of work to do, beyond even the consideration of these important appointments, and many the references to the sub or working committees. The Implement committee has, more particularly, been called upon. First of all, they have to reply to a memorial from the exhibitors of steam cultivators who ascended the heights at Salisbury. The point of this petition, which is being fully canvassed in our columns, is, that the steam plough should have a little more fair play at Chester; and this the Implement committee is to look to. It is really gratifying to see with how much good feeling the different inventors of steam ploughs are working on to the one great end. Mr. Fowler and Mr. Williams are about to unite their forces; while Mr. Fowler, in a letter addressed to us only this week, bears witness to the results arrived at by Mr. Smith of Woolstone:—"Mr. Smith has kindly consented to show his farm as a practical proof of the value of steam cultivation; and I intend to station a suitable person in the neighbourhood, to wait on those wishing to see it." Or you may have the effect of such a system on the farms of Mr. Mechi, Mr. Hobbs, or Mr. Killin; and this very week Mr. Williams is to begin on a forty-acre piece in the occupation of Mr. Owen, the chairman of the London Farmers' Club. In good truth, the steam plough is again looking up—one of the most encouraging proofs of its progress being the spirit evinced by its several supporters rather to aid than to retard each other.

Then, there have been numerous suggestions as to the trials of the steam-engines—the "Blue Ribbon" honour of the agricultural year—with already a manifest anxiety as to "who is to win?" and every district with its own favourite. And further, the President has called the attention of the Council to the completion, this year, of the triennial arrangement for the trial of implements at the Country Meetings of the Society, and to a consideration of the propriety of its renewal or continuance for the future. Acting on this hint, a committee, consisting of the members of the Implement Committee, and of Mr. Howard, Mr. Shuttleworth, Mr. Caldwell, Mr. Huskinson, and Mr. Amos, is appointed, with power to confer with a deputation from the body of the implement makers, and to report to the Council at their next monthly meeting in June. It may be asked who are responsible for all the good or evil doings of this Implement Committee, and we give, accordingly, the elements of its construction:—Chairman, Colonel Challoner; Lord Portman, the Speaker, the Hon. W. G.

Cavendish, Sir A. Macdonald, Sir J. V. Shelley, and Messrs. Brandreth, Brandreth Gibbs, Hamond, Hobbs, Hoskyns, W. Miles, M.P., and H. S. Thompson.

What will the exhibitors have to say in answer to this invitation? Has the triennial plan worked well or not? We incline to think even better than could have been expected. The question then is—Shall we continue it?—Return to the old system?—Or, have no prizes and no trials at all? The answer would seem to be self-evident; although the small end of the wedge may have been introduced.

Sorely to the disappointment of Oxford, the Country Meeting for 1859 is to be held at Warwick—a very good selection. The Society has no need as yet to run upon a beaten track. There is plenty of fresh ground still to be broken up. In addition to its convenience of situation, Warwick has other attractions to recommend it. The frequenter of these meetings must in time see all the best of his own country, quite as a matter of business. There was the run over from Carlisle to Windermere; the drive from Salisbury to Stonehenge; the lions of Oxford and Cambridge. And there will be Kenilworth, Stratford, and Guy's famous castle, in pleasant association, but as agreeable variety with sleek Shorthorns and iron ploughs.

One word more as to these recent proceedings, and that one to the important matter of Finance. A member who has not paid his subscription must not expect to receive his copy of the *Journal*. And how would a man get on without the *Journal?* With such a threat in terrorem, Mr. Hudson's time for the next fortnight should be chiefly given to the signing of post-office orders.

THE NEW MANURE—CLAY FROM THE GAS-WORKS.

We congratulate the agricultural world on the improved tone pervading the teachings of its scientific instructors. Theories are enunciated cautiously, and modestly guarded with allowances and provisoes; and research in the laboratory is duly acknowledged as elucidating rather than dictating practical husbandry. Take, for instance, some most valuable papers in the last "Part" of the R. A. S. E. Journal.

The Rev. Mr. Bowditch has discovered a new source of manure—namely, in the purification of coal-gas by means of clay, which absorbs the ammonia hitherto unarrested by the ordinary process. Carbonate and sulphate of ammonia thus acquired by the aluminous soil used, are doubtless good fertilizers; but what will be the effect of the sulphocyanide of ammonium and other metals which it also retains in considerable quantities? Well; "sulphocyanic acid is found in the saliva of man and the sheep, and must either be taken in the food as such, or produced in the body by the vital processes. Mustardseed, again, is known to contain the sulpho-cyanide of allyle. Horseradish and Alliaria officinalis contain the same substance. The garlic and common onion contain an oil which differs but little from that of mustard, &c. With these examples of analogous compounds in the animal body and in vegetables, there seemed little risk in applying sulpho-cyanides in quantity." Again: "Many compounds of cyanogen, produced by the distillation of coal and retained by the clay, found corresponding ones in the urea and uric acid of urine and guano; the hydrocyanic acid of bitter almonds, peach kernels, the leaves of the cherry laurel, &c., when distilled, and other compounds of both kingdoms of Nature, which it is beside our object to discuss." Now, what we have to praise is, that instead of directly seizing the conclusion that the doubtful substance must be a fertilizer because it is found in the animal and vegetable organism, this chemist is content to take these facts as simply *warranting the risk* of a practical trial, and tests *in the field* whether or not the ingredient he believes to exist in onions will injure or improve them when applied as a manure. Accordingly he tries the clay, and greatly augments his crop. "At present," he says, "any attempt at producing analyses to account for visible effects, and saying thus and thus these substances act—hence, and not elsewhere or otherwise the fertilizing power is obtained—would be, in my opinion, unpardonable presumption. The analyses must be explained by the phenomena: the phenomena must not be tortured to fit the analyses. *I have hitherto withheld the results of much labour* on this ground, and propose to learn from, and not to impose interpretations upon, Nature. Chemistry is honoured by becoming Nature's handmaid: it is made contemptible when put forward as her guide."

One of the most successful experiments with the new manure—"clay from the gas-works"—was its application to turnips. "This was the very application which theory would indicate. Here was the most sulphurized of all manures being applied to the most highly sulphurized of our field crops. The question put was, 'Will excess of sulphur in manure promote excess of growth in turnips?'.... The crop was inspected by many, who all agreed that they had never seen it surpassed." Yet this was on a piece of poor soil in a garden. Of course, the usual explanation is ready enough: "The ammoniacal salts and other compounds of nitrogen promoted this luxuriant growth of turnips—the sulphur played but a subordinate part;" and chemists, unfortunately, lend their authority to this opinion, asserting that soils always contain an abundance of sulphates, and therefore farmers need not trouble themselves to add sulphur. "But is this so? May not the superior action of dissolved bones, superphosphate, and similar compounds, be due in a great measure to the *sulphuric acid* they contain, and not simply to soluble phosphate which does not exist in the soil, or insoluble phosphate 'in a fine state of division?' I confess myself strongly of the opinion," says Mr. Bowditch, "that the sulphuric acid is a very potent agent in bringing about the good results which are so familiar, from compounds in which it is used; and when we recollect the raising of a crop of turnips by watering the drills with dilute sulphuric acid only, and the other successful experiments collected by Johnston ("Experimental Agriculture," p. 104-5.), I cannot help attributing the success with turnips, above described, as much to the sulphur compounds as to the compounds of nitrogen. Does not the known efficacy of woollen rags as a manure point in the same direction? I know, of course, how large a proportion of nitrogen they contain, and how this is usually dwelt upon; but is it considered that they contain an amount of sulphur which is capable of forming 12½ per cent. of their weight of anhydrous sulphuric acid, and that the hop, for which they are almost a specific, contains a sulphurized oil nearly, if not altogether, similar to the oils of mustard, garlic, onions, &c.?" There is independence of view in these remarks, a breaking away from the beaten track of Liebig and Lawes, and the customary authorities, and an opening up of fresh ground for thought on the subject of plant-food—that we both admire and approve. The following shrewd observation indicates one cause of our long subservience to nitrogen as the royal manure: "When nitrogen compounds can be purchased more cheaply than at present, other ingredients of manure may perhaps receive closer attention than they now obtain. The extreme importance, and increasing price of nitrogen, has pushed it somewhat beyond its true position."

Passing by the proposal of the new manure for grass lands—in which we are reminded that "all the nitrogen of wool and hair came originally from the soil, and most of it from grass;" that "the five millions of pounds of sulphur on the sheep's backs of this country were principally derived from grass," and thus the continuous removal of minerals without return must tend to deteriorate the land—we take another instance of our author's moderation in the presence of startling and very winning results from his experiments with the new manure upon potatoes. "The 'potato-disease' has an interest for everyone, whether he be a producer or consumer; and as an experiment of last year bears upon the subject, it should be known." Of 3 acres of Prince Regent potatoes, 2½ acres dressed with the gas-clay were free from disease, and on the remaining half acre the principal portion of the crop was affected; the disease appearing badly in all the district, namely, Wakefield. Whereupon we have these observations: "I was prepared for the better crop which accompanied the special manure, but its influence over disease was entirely unexpected. I think also it is unexplained. *If* the disease be owing to the attack of a fungus, and *if* sulphur in some or all of its combinations be a preventive, and *if* carbonic acid and arsenic (both of which exist in small quantity in the clay) prevent its attack or its growth, we may account for the prevention in this particular case; but where the whole subject is so entirely beyond the limits of our present knowledge, it appears more becoming to hesitate in the expression of opinion. What is certain is, that the attack of disease, and of course the presence of a fungus, could be traced down the stems below the earth to the tubers, *where it stopped when these were in contact with the gas-manure*, and to which it extended in all other cases. But an isolated instance does not prove that we have here a specific against disease, nor even that the action of the same agent will be the same on other soils and under other circumstances. Trials alone can do this, and trials in sufficient number to warrant an induction."

A great discovery seems here to be close at hand; and yet it is the part of wisdom to restrain the first impulse to hail with rejoicing the apparent new truth, and wait with patience for the tardy proof or too speedy disappointment.

THE MEMORIAL FROM THE EXHIBITORS OF STEAM CULTIVATORS.

We proceed with the memorial which Mr. Collinson Hall, Mr. John Fowler, junr., Mr. Charles Burrell, and Mr. John A. Williams have addressed to the Council of the Royal Agricultural Society:

"We, the undersigned exhibitors of steam-ploughs at Salisbury, are of opinion that the trial of those machines at that meeting was of an unsatisfactory character, and not such as was calculated to develope their merits, but rather, by putting them into exceptional circumstances, to injure them in the eyes of the public, and was not consistent with the importance of the subject, or a fair return for the large outlay incurred by us in exhibiting them there." Here we pause to express, not our approval of the construction of this sentence, but our hearty assent to its statements. Everybody who saw the ground will testify that the trial was a mockery, and that it was a hard case for the inventors, after their immense pains and pecuniary sacrifices, to be placed before the assembled agricultural world in a position where their powers could not possibly be displayed.

"As the third offer of the Society's premium has again brought the subject under our notice, and as we cannot but think that *the withdrawal of those schemes at present most prominently before the public from competition* would be prejudicial to the progress of the invention, and would greatly detract from the interest of the Society's meeting at Chester, we would respectfully request that the Council would consider whether such terms and conditions of trial could be arranged, and published previous to the day of entry, as would enable those intending to exhibit to judge of *the advisability of their incurring the heavy expenses necessary to such a competition.*"

Though the members of these sentences do play a little at "cross-purposes," still, in spite of the composition, it is clearly to be understood that the exhibitors are not again anxious to purchase "a pig in a poke;" and, as we shall see, they have good reason for requiring precise explanation of what awaits them at Chester.

"As we observe that the judges in their report of the trial at Salisbury express the opinion, 'that the wording of the premium can never justify a judge in giving a prize whilst a *plough* is used,' it is we think essential that it should be clearly stated *whether any or all those plans which we represent are excluded* by the wording of the offer of the premium from competition."

Now, five of the judges understand by the words of the Society's offer, "an economical *substitute for the plough*," a machine that shall "turn-over" the soil in a different manner to that of the plough. No modified form of plough, having share and mouldboard, and turning over a furrow-slice by a screw-wedge action, can receive a prize at their hands. They must have a new variety of tilling implement. But two of the judges understand the terms to mean, a substitute for the common or *horse* plough. That is, a steam machine which can economically take the place of the present horse plough, no matter whether effecting precisely the same or a better tillage operation. They want either ploughing, or some other process equally effective, done by steam-power instead of horses. The thing you "substitute" for another is not necessarily of *a different kind;* but it may be either of the same or of a different kind, provided only that it "stand in place of" or answer the purpose of the other. It might be argued, indeed, that a "substitute for a plough" *must perform the work called ploughing;* otherwise, it would not take the place of the old implement; and not being able to accomplish the same end, could not be called a "substitute." But why quarrel about words? Mr. Wren Hoskyns says, "When it is already evident that a plough worked by steam-power gets rid of *some* of the evils incidental, on certain soils, to that worked by horses, it becomes quite conceivable that *retaining substantially the same form*, it might yet come to get rid of those remaining. The nominal objection could hardly survive the real one, since the only object of substitution is the complete removal in the substitute of the defects in the original. This accomplished, substitution is literally as well as substantially attained, for *there is nothing in the etymology of the word to prohibit similarity of form in the instrument* which shall furnish the whole of the qualities required . . . .; while it is equally true that there is nothing in the nature of the prize which prohibits a suspension of judgment, while this object may be in process of accomplishment." Let the Council state plainly whether they understand their own offer in this sense—whether they will award the premium to the steam machine that is found the most "economical substitute for the plough or the spade," no matter whether coulters, shares, and mouldboards be parts of it or not, so long as it fulfils the object in view. This is, the tillage of land by steam-power as effectively and more advantageously than by horses.

"We would also suggest that to insure such a trial of these machines as the importance of the subject deserves, a much longer time is necessary than can be given during the show week by the judges, who have a great many other duties to attend to; and that it would be of great importance that the judges of this department should have their whole time at their disposal for this subject, as no fair comparison with horse labour can be instituted except by a lengthened trial." We hope that this request will be complied with; and that the steam-cultivator may not be left for the cursory inspection of the judges, after examination and trial of the thrashing machines, chaff-cutters, and mills. Let us have a trial of several days' duration, with coal weighed, time taken, and work measured; and in a situation favourably adapted to this young class of invention, rather than selected and laid out so as to baffle the inventors with unfair and unusual obstacles. Let us not absurdly test general efficiency by means of a maximum of difficulty. "The length of time that elapses between the publication of the judges' report and the adjudication of the prize also exercises a very prejudicial effect on the business to be done at the meeting. So much so that, in our opinion, a machine known not to be competing for the premium stands a better chance of obtaining orders on its own merits than one upon which a report is expected in a few months, and for which the public are likely to wait." There can be no reason why the judges of the steam cultivators should not give in their report while on the spot; though it is perhaps too much to expect the necessarily elaborate reports upon all the numerous classes of machinery and multitudinous "miscellaneous articles" in the show-yard. Let the judges of steam cultivators, reapers, thrashing machines, and steam-engines at any rate, if not of other important machines, have time to conduct the necessary experiments, and afterwards compose their separate reports, before or during the public show-days. And for this purpose the work should be more divided than heretofore, rather than more classes forced upon fewer judges.

THE TRIALS OF THE THRASHING-MACHINES.

SIR,—The inclosed paper was laid before the Council of the Royal Agricultural Society of England, at the meeting yesterday. If you can find room for it, I shall feel obliged.

I am, Sir, yours sincerely,

Long Sutton, May 6, 1858.

J. A. CLARKE.

TO THE COUNCIL OF THE ROYAL AGRICULTURAL SOCIETY.

GENTLEMEN,—As the judges of thrashing-machines at Chester are likely to have an unparalleled amount of labour to perform, if left to investigate, without previous plan or agreement, the many points of excellence and defect in those complicated pieces of mechanism, and the varied processes they perform, I am induced to recommend the preparation of a *table, or schedule of points for observation*. This would be at once a concise form of "Instructions for the Judges," saving them much time in discussion as to the basis of their examination, and a valuable statistical detail of facts and criticism for the public.

The *performances* of the machines are ascertained by the "trials," and the *mechanical principles and construction* are judged of by inspection; the prises being awarded to those machines which, in the opinion of the adjudicators, possess the largest balance of advantages. Now, to shorten the duration of trial in work is not desirable; because, the longer a machine is engaged in thrashing, the better chance will there be of discovering its capabilities for shaking, riddling, and winnowing efficiently. But much of the time occupied in examining the mechanical merits and workmanship may be economized, I believe, by means of a *systematic*, instead of a cursory, inspection of the constructive details. To sum up the comparative merits of a great number of machines, from any notes of good or faulty "points" which may have been jotted down whilst looking at each, must often be difficult enough. How much simpler to have in your hand a list of the different conditions or capabilities to be looked for and considered in every machine brought before you, and just note under each head your opinion of the relative merit of each machine in that particular respect!

A table might be drawn up, stating the relative standing of the various machines, as regards *mechanical merit* and points which cannot be determined in mere trials, thus:

Name of Exhibitor.	Horse-power required to Drive the Machine *Empty*, at 120 revolutions of the Engine per Minute.	Horse-power required to Thrash at the Rate of 10 Sheaves per Minute.	Simplicity of Working-Parts.	Steadiness and Freedom from Liability to Wear.	Strength and Durability.	Weight, Compactness, and Portability.	Price.
—	—	—	2nd class	1st class	1st class	2nd class	—
—	—	—	1st class	2nd class	1st class	1st class	—
—	—	—	3rd class	1st class	1st class	1st class	—
—	—	—	1st class	1st class	2nd class	2nd class	—

The data in the second and third columns, ascertained by the dynamometer or testing-machine, would reveal certain excellencies or defects in the mechanism. For the next four columns (or more, as other points may be added), each machine must be inspected, and its rank as first, second, third class, &c., agreed upon by the judges, and noted under each head. The peculiar value of such a table would be, its containing the decision of qualified men upon the precise points that purchasers may be anxious about, and whatever qualities or merits the judges might finally consider important enough to carry off the prise. Still purchasers would know which machines excel or fail in every separate particular, and could therefore select the machine best suited to their peculiar district or business.

A tabular statement of *performances* we have had before; but I would suggest that the method of taking certain numbers to represent "perfect work" in each of the several operations, stating the degrees of merit of each machine by proportional numbers, and adding the figures together for the "total comparative merit," must necessarily give a fallacious result. Who is to say that when "clean thrashing" is represented by 20, "clean shaking" is to be set down at 15, "chafings free from corn" at 15, "chaff free from corn" 15, "corn unbroken" 12, "straw unbroken" 8? It is easy to see that by assigning other arbitrary numerals for the different points, according to the view we may happen to take of their relative importance, very different sums-total of "comparative merit" would be obtained for the several machines tried. Instead of "unbroken straw" (for instance) being a point of more than half the merit of "clean shaking" or "chafings free from corn," in some localities farmers want their straw broken; and considerable difference of opinion may exist as to the relative value of perfection in knocking-out, shaking, and riddling.

Let the proportional merit of the machines in each process be stated, without attempting to calculate a comparative total of excellence or inferiority, the table of performances being somewhat as follows:—

					PERFECT WORK REPRESENTED BY							
					10	10	10	10	10			
Name of Exhibitor.	Number of Sheaves thrashed in half-an-hour.	Corn thrashed.			Clean thrashed.	Clean shaken.	Chafings free from Corn.	Chaff free from Corn.	Corn unbroken, or state of Barley.	State of Straw.	State of Shaker after trial.	State of Riddles after trial.
		Best Grain.	Tail.	Screenings.								
		st. lb.	lb. oz.	lb. oz.								
—	000	00 00	00 00	00 00	10	10	8	10	10	Whole.	Not clear.	Clear.
—	000	00 00	00 00	00 00	8	6	10	6	10	Broken.	Clear.	Foul.
—	000	00 00	00 00	00 00	10	8	10	8	6	Much broken.	Choked.	Not clear.

Other points may be added, as, the quantity of "white-heads," the due separation of chafings from the long straw, freedom of the chaff from chafings, &c.

The average time worked by each machine at Carlisle was 15½ minutes with wheat, and 8½ minutes with barley; and seeing that at Salisbury there were forty combined machines, besides simple portable and fixed barnworks, it is hardly to be expected that much more time can be allowed for each trial at Chester. But whether a quarter or half-an-hour, I consider that *each machine should be run for the same space of time;* instead of thrashing a certain fixed number of sheaves, so that at Carlisle one machine ran 22 minutes, while another was only 11 minutes doing the same work. The clear or choking condition of shaker and riddles is often apparent only after a certain period has elapsed in working; hence let the time be the same for all the machines, and the sheaves counted to the feeder. The quantity of corn thrashed, and the efficiency of the finishing dressing, should be ascertained by weighing off the several bags as they fill, which may be readily done. Inspection will suffice for determining the amount of corn left unthrashed in the straw, the corn carried over the shaker instead of dropping through, the state of the straw, the condition of the grain as to splitting, nibbing, &c.; but for detecting the presence of corn among the chafings and chaff, *these products ought to be put through a common dressing-machine or chaff-screen, worked by hand.* I believe that dressing all, or a certain quantity of, the chafings and chaff separately in this way, would reveal a great, though unsuspected, waste of corn by most thrashing-machines; and the precise proportion of this loss would be at once ascertained, when little or none might be apparent to mere inspection of the refuse from the riddles and winnower.

Numbers may be employed to denote the comparative degrees of efficiency in the several operations performed, provided they are not taken in the aggregate as indicating the general effectiveness of the machines.

In the two last columns of the table are given *the state of the shaker* and *the state of the riddles* when the trial is concluded—very important points; for in few machines can be found a shaker or riddle incapable of choking with straws and short refuse: though, nevertheless, effective shaking, coldering, and chaffing throughout a heavy day's work depend entirely upon the ability of the riddles and shaker to maintain their apertures clear and open.

The above suggestions are offered in no spirit of dictation, but simply with a desire to facilitate the labour of the judges; while at the same time securing a scrutiny and record of details useful to the public.

I beg to subscribe myself, gentlemen,

Yours respectfully,

JOHN ALGERNON CLARKE.

Long Sutton, Lincolnshire,
May 3rd, 1858.

THE VETERINARY COLLEGE IN RELATION TO AGRICULTURE.

The alliance, continual communication, or mutual dependence of one on the other, between Agriculture and the Veterinary Art, is even now by no means as close as it should be. It is not, indeed, so very long since, that the passed man from the College devoted himself almost entirely to the better sorts of horseflesh, while "the cow-doctor" still claimed nearly all the practice on the farm. It would be hard to say who is to blame here. In the earlier history of the College the aid of the veterinarian was of course not everywhere obtainable; and there are yet many districts where he is scarcely within hail. Farmers had so to put up with the best advice they could command at home, and the old village-farrier continued to kill with impunity. But times have altered with us in more ways than one. Year after year there are more and more qualified practitioners sent forth, and pari passu the value of our different kinds of stock has as certainly increased. The health of a Shorthorn heifer may be quite as important a matter as that of a four-year-old hunter, and a Southdown ram as well worth attending to as a half-bred stallion. The registered V. S., then, should be brought to consider the diseases of cattle as one of the most prominent points of his profession.

We shall most likely be assured that he does do so. We repeat, however, that the communication between the farm and the college is not so direct or habitual as the proper interests of either should make it. The Royal Agricultural Society has, to be sure, done everything it can to improve on this acquaintance, but with no very lasting effect. Every now and then Professor Simonds will give us a lecture, or a peculiar case will turn up which creates a temporary impression. Honestly, even this is, more often than not, a volunteer offering on the part of science, rather than in answer to any application from the farmer himself. As we have had occasion to say before now, the members of the Society are but too indifferent to the privileges they command in connection with the Veterinary College.

There has been lately rather a striking example of this. The London Farmers' Club called a discussion on the diseases of lambs. Despite the number of sheep fairs being held about the same time, some very good men answered the summons. They came, however, all with the same object—to learn. The very gentleman who read the opening paper could do little more than complain of his losses, and lament the curious character of the disorder. Mr. Marshall's speech was but the key-note to what followed. The meeting was palpably at sea as to suggesting a remedy; and one looks in vain for any resolution to that effect. The only preventive Mr. Paull had been able to find was to change the lambs on pastures fed by beasts the previous year. This had sometimes produced effect, but still he had been a great sufferer. Captain Davy removed his lambs to the after-grass, but had suffered very much from the malady. Mr. Owen Wallis attributed the evil to over-stocking. Mr. Little knew nothing of the disease in question. Mr. Williams said the diseases of sheep appeared beyond the aid of the veterinary surgeon. Mr. King had been advised to allow his flock of lambs to run over two or three fields of wheat, and the result was that he lost more lambs in this way than when they were shut in. Mr. James thought that where there was a couple of lambs there was more disease and mortality than with a single one. And Mr. Owen, the chairman, fancied the state of the blood had a great deal to do with the kind of disorder in his lambs.

Now in the whole of this discussion the opinion of but one veterinary surgeon was quoted. This was by Mr. Marshall, who gave a report from Mr. Jekyll of the post mortem examination of some lambs that had died of consumption. It is satisfactory to know, as we do, that the gentleman so called in is of recognised ability in his profession. He speaks to the thread-like worms found in the lambs; but unfortunately his research would seem, so far at least, to justify Mr

Williams' opinion that the sheep is beyond the aid of veterinary art. Mr. Jekyll can only say—"As a cure I have tried the internal exhibition of small doses of turpentine with cold gruel, but without success. I have also made them inhale chlorine gas; and the few on which I experimented recovered, but it was late in the season, and I think it likely they would have recovered without this. I intend, however, to make a further trial of this remedy; but while a ready means of cure is of importance to us, the cause and a preventive are of much greater. The history and stages through which these pests pass, and how they enter animal bodies, would very much aid us; but I fear all this is wrapped in a shroud of mystery so deep that science must labour long and perseveringly before she can bring forth the naked facts for the benefit of man." Mr. Marshall himself regretted that no one had given them the result of a post mortem examination of any of the lambs that had died in Berkshire, or the West of England; and Mr. Williams, despite his previous declaration, thought that if some dead lambs—say five or six from different farms—were sent to the Veterinary Professor of the Royal Agricultural Society for examination, he would with great pleasure do what was required. Mr. Corbet, the Secretary of the Club, said that the Professor had asked for such animals over and over again.

Let us now see what the Veterinary College has to say for itself. The week following the customary annual report from this Institution was read at the weekly Council Meeting of the Royal Agricultural Society. It will be found in another part of our paper of to-day. Parts of it would seem to have been written almost in direct answer to what occurred at the Club. As for example:—"From circumstances which would appear to be irremediable, few cattle are admitted as patients at the college. It is a matter of regret to the Governors that no measure which has been tried by them in conjunction with the Society has availed to bring to the College Infirmary a sufficient number of oxen, sheep, or pigs when the subjects of disease. Even the merely nominal scale of charges which was adopted a few years since for medical attendance, operations, keep, &c., of such animals, has failed in effecting this most desirable object; and the Governors are at a loss to know what more can be done to remove the apathy which exists in the agricultural body with reference to this important means of imparting practical information to the pupils." The Veterinary College has at any rate little doubt as to who is to blame for that want of intercommunication of which we complain.

Then, again, another clause in the report is equally well put, and as directly or more applicable to the wants of the farmer: "The visits into the country by the Veterinary Inspector, on the authority of the Council, have not been very numerous this year, and the Governors would be glad to see that the arrangement which has been made with regard to the inspection of diseased cattle on the premises of agriculturists was likewise in more general use, for they believe much good would result therefrom, not only in arresting the progress of disease, but in investigating the causes, with a view to their removal, on which it was found to depend."

Would it not have been better that a post mortem examination of a few of Mr. Marshall's lambs had been made under the authority of the Veterinary College? Or, that Mr. Simonds had been called in, to confer with Mr. Jekyll as to the nature of the disease? Might not Mr. King ask the College, quite as appropriately as the Club, "How he ought to treat his lambs?" Surely it is here that Practice should call in the aid of Science, in place of being simply content with changing to wheat or after-grass, and still being "a great sufferer." Ought we to rest satisfied, in this age, with discovering worms in the lungs of our sheep, but "how they got there we had never been able to find out?" The question, however, concerns alike the followers of either pursuit. A veterinary surgeon, of eminence in his district, admits that the disease has so far baffled his researches; while some of the sufferers speak of it as beyond the power of his art. Has this as yet been fairly or fully tested? The profession, in any case, should look to it. They report that they have now sent out more qualified students than in any previous year. Have these young gentlemen had the opportunity of studying consumption in sheep? If not, if Mr. Marshall, or Mr. King, or Mr. Paull will not send up their lambs, let the College send for them. Or, let Mr. Simonds pay either of these gentlemen a visit. We will answer for his reception. If there be "apathy" on the one side, there must be none on the other.

In some quarters, at any rate, the value and want of the Veterinary Art in connection with Agriculture is coming to be properly appreciated. At the late Show of the Dublin Society, one of the best points in the different addresses delivered is to be found in the speech of a practical agriculturist, Lord Talbot de Malahide:—"He thought it of the utmost importance that further attention should be given to veterinary science. He believed that one of the objects which the Highland Society had in view was the consideration of that subject; and of all the societies that he knew, he knew of none that could take that subject up with greater advantage than the Royal Dublin Society. But if it were to be done, it should be done effectually; it should not be done by having a few lectures, but by having a veterinary hospital; and it would be necessary to teach the science practically not only to those who were to be professors, but almost an equally important matter would be to have an inferior class in attendance, such as they found for nurses in hospitals, and a regular course of instruction should be given to those "nurses" over the welfare of the animal creation. He considered this subject one of national importance, and worthy the attention of every person who had the welfare of the country at heart."

Even here, in England, we may yet echo his Lordship, and impress upon our agriculturists the importance of paying more attention to Veterinary Science.

THE SOIL

The soil is the farmer's capital—to make it pay him good profits, his business. His means are invested in land, and from its generous bosom he must draw support for himself and family—house, food clothing, fuel, books, papers, education for his children—all the necessaries of life, without which man cannot live, and all those luxuries without which life is hardly worth the having. The President in the White House, our ministers at foreign courts, the American loungers in Paris or Rome, the missionary on the burning sands of Africa, the merchant in his counting-room, and the mechanic at his bench, all derive sustenance from American soil, Truly do the Scriptures say, "The profit of the earth is for all; the king himself is served by the field." This fact no political economist can deny, no sophism can conceal. To keep his capital from depreciation, and in such a condition that it may be able to honour his many and necessary drafts, so as to be in no danger of a panic, and that no suspension may become necessary, is the great business of the farmer. It is, then, of the greatest importance that we should know the *character* of the soil which a kind Providence has provided for our sustenance, and the best method of securing this desirable result.

We need not tell American farmers that our soil differs in character, that we have *clayey*, *loamy*, and *sandy* soils—nor that these different soils require a different treatment, and are suited to different crops. And yet we often think those important matters are forgotten; for how few, who send us reports of their crops, of their success, or their failures, give even a hint as to the nature of the soil in which the crops were grown, or the experiments tried! Then there is much need of information as to the best manner of cropping and manuring the different varieties of soil. We know of land in this section, that ten or fifteen years ago was considered so entirely unsuited to agricultural purposes that it was thought no sane man would buy it for farming purposes. Starvation or retreat was supposed to be the sure fate of any one bold enough to try the experiment. These lands are now the most productive and valuable of any in this part of the State. This change has been brought about by skilful culture and a wise adaptation of crops to the soil.

Every farmer should possess a general knowledge of the formation, composition, character, and classification of soil, and on these points we shall endeavour to make the whole subject so plain that it will be understood and remembered by all.

CHARACTER AND FORMATION OF SOILS.

Soils are those portions of the earth's surface which contain a mixture of mineral, animal, and vegetable substances in such proportions as to adapt them to the support of vegetation. We quote from a valuable article in *Morton's Encyclopedia*;

"On examining the various soils in this or any other country, they will be found to consist generally, 1. Of larger or smaller stones, sand or gravel. 2. Of a more friable, lighter mass, crumbling to powder when squeezed between the fingers, and rendering water muddy. 3. Of vegetable and animal remains (organic matter.)

"On further examination of the several portions obtained by means of washings, we find,

"1. That the sand, gravel, and fragments of stones vary according to the nature of the rocks from which they are derived. Quartz-sand, in one case, will be observed as the predominating constituent; in another, this portion of the soil consists principally of a calcareous sand; and, in a third, a simple inspection will enable us to recognize fragments of granite, feldspar, mica, and other minerals.

"2. In the impalpable powder, the chemist will readily distinguish principally fine clay, free silica, free alumina, more or less oxyde of iron, lime, magnesia, potash, soda, traces of oxyde of manganese, and phosphoric, sulphuric, and carbonic acids, with more or less organic matter.

"3. The watery solution of the soil, evaporated to dryness, leaves behind an inconsiderable residue, generally coloured brown by organic matters which may be driven off by heat. In the combustible or organic portion of this residue, the presence of ammonia, of humic, ulmic, crenic, and apocrenic acids (substances known under the more familiar name of soluble humus), and frequently traces of nitric acid, will be readily detected. In the incombustible portion, potash, soda, lime magnesia, phosphoric, sulphuric, and silicic acid, chlorine, and occasionally oxyde of iron and manganese, are present."

All cultivated soils present a great similarity in composition, all containing the above chemical constituents; and yet, notwithstanding this similarity of composition, we observe a great diversity in their character. This is caused by the different proportions in which the constituents are mixed together, the state of combination in which they occur, and the manner in which the different soils are formed. All arable soils contain organic matter, varying from half to twelve per cent. Good garden mould frequently contains from twenty to twenty four per cent. of its own weight, and in peaty pogs from sixty to seventy per cent. is not uncommon. It was once thought that the richness of a soil was plainly indicated by the proportion of organic matter it contained; but careful analyses of seven specimens of the best wheat soils of Scotland, and yielding about alike, being made, they were found to range from three to ten per cent. The poorest peaty bogs, also, contain the greatest amount of organic matter, while they are notoriously unproductive.

The organic matter in the soil is due, for the greater part, to the vegetable remains of former crops.

The prairie soils are rich in organic matter derived from the annual decay of the grass for centuries. The soil of the forests is enriched by the fallen leaves.

The manner in which soils are formed cannot be doubted by any one who has observed the appearance of large rocky masses, the bare surface of their smoother and harder parts, and the growth of mosses and small plants on the more softened portions. The soil in valleys surrounded by rocky mountains shows very evidently that they originated in the disintegration and decomposition of the solid rocks in their neighbourhood. One of the principal agencies in effecting a gradual disintegration of solid rocks is the oxygen of the atmosphere. "Oxygen possesses a great affinity for many mineral substances, and has, consequently, a powerful tendency to form new compounds. Those compounds, or oxydes, being always more voluminous, looser, and less compact, are the primary cause of the bursting of many rocks, particularly of those containing much iron. In the course of the formation of these oxydes, the compact texture of the rock is broken up, and the whole mass of the rock gradually crumbles down."

Another and powerful agency in the formation of soils is the carbonic acid of the atmosphere carried down by rain. Limestone is easily attacked by rain water, as the carbonic acid which the water contains dissolves the carbonate of lime. "On feldspar, granite, and other minerals consisting of silicate of alumina and an alkaline silicate, carbonic acid and water exercise a highly important action. Under their influence these minerals are decomposed into alkaline silicates, which in their turn give rise to silica and carbonate of potash or soda, and into silicate of alumina, or pure clay."

The lower orders of plants and animals take a very active part in the formation of soil from solid rocks. The seeds of lichens and mosses floating in the air attach themselves to the surfaces of rocks which have become partially decomposed by the action of the air and rain, as before described, and finding here sufficient food, grow, thus keeping the surface of the rock moist for a longer time after rain, and giving the water a better opportunity to exercise its dissolving powers. Insects feed on the moss; and both insects and plants die and decay. A thin layer of more fertile soil is thus formed, which is soon taken possession of by a higher order of plants and animals; which in their turn die, leaving a better estate to the succeeding generation.

Mechanical causes, too, operate upon rocks. The wind, thawing and freezing, and the principle of gravitation, effect them more or less.—Rural New Yorker.

WHAT BECOMES OF THE BONES: THEIR USE AND COMMERCIAL VALUE.

Mr. Green, one of the many engaged in the business of calcining bones in New York, gives the following information as to the use and value of bones. Mr. Jones' boiling calcining establishment is situated on the Jersey side of the Hudson, sixteen miles up, nearly opposite Yonkers. To collect the bones from the *chiffonniers* he employs in this city eight men, eight horses, and four carts. A labourer invariably goes with each driver. The largest collections are made in the Eleventh, Seventeenth, Eighteenth, Nineteenth, Twentieth and Twenty-first, Wards. They commence their rounds as early as 7 a. m., and by 1 p. m. the collections are deposited in the vessel that is to convey them from the city. The law requires all the carts engaged in this business to be boxed or covered with canvas. The price paid for bones varies according to quality. Thigh bones of bullocks rank first, as they are the only bones in an ox that are fit for turners' use; they are mostly manufactured into handles for tooth brushes, the natural curve of the bone giving the desired shape to that indispensable article for the toilet. They are worth from ten to twelve cents each. The jaw bones rank next, and are worth 18 dollars a thousand. The "short" bones, as they are termed, such as leave the family table, are worth from 40 to 50 cents a basket. To give some idea of the amount of money paid for bones, when we consider the number engaged in the business of bone-boiling, exclusive of the Barren Island business, we will state that Mr. G. pays for bones in this city alone an average of 100 dollars a day. The fore leg and hoof are usually bought by manufacturers of glue, Peter Cooper being the heaviest purchaser of this description of offal; and when they are done with, they are sold to the bone dealers at two cents a pound. The hoofs are disposed of at the rate of 40 dollars a ton, and are afterwards made into *horn* buttons and Prussian blue. Horse hoofs and sheep hoofs and horns are sold at 15 dollars a ton.

On the arrival of the bones at the factory, the thigh and jaw bones are sawn so as to admit of the removal of the marrow. They are then thrown into a vast cauldron, and boiled until all the marrow and fatty substances attached to them are thoroughly extracted. The fat is then skimmed off and placed in coolers, and the bones are deposited in heaps for assortment. The thigh bones are placed in one heap for the turners: the jaws and other bones suitable for buttons are placed in a second pile: the bones suitable for "bone black" come No. 3, and the remainder are ground up for phosphates and manures.

"Bone black" is used by sugar-refiners, and is worth from 2½ to 3¼ cents a pound. To judge of the amount used in this city alone of this article, in the eleven immense sugar refineries in operation here, it is only necessary to state that "Stuart's" and the "Grocers'" refineries pay annually in the neighbourhood of the city 40,000 dollars a year each for "bone black."

Of classes Nos. 2 and 3 we were furnished with no reliable data. No. 2 is used in the manufacture of phosphates. No. 3 is made into manure, and sold at prices ranging from 38 to 55 cents a bushel, according to quality, but generally averaging about 50 cents, delivered at the factory.

Of the amount of soap-fat produced from bone-boiling, we can only say that our informant showed by his books that the sale of soap-fat from his factory from June, 1856, to June, 1857, amounted to 19,000. dollars Of this amount 14,000 dollars was paid by one house, and we were assured that this was but a moiety of the amount the house annually purchased.—Hunt's American Mrchant's Magazine.

SALE OF MR. CARTWRIGHT'S HERD OF SHORT-HORNS, AT AYNHOE.

BY MR. STRAFFORD.

On Wednesday, May 5, the entire herd of short-horns, belonging to T. R. B. Cartwright, Esq., of Aynhoe, were sold by auction, without reserve, at the Home Farm, Aynhoe, by Mr. Strafford, the well-known stock auctioneer, of London. There were 46 head of very fine cattle, most of which were purchased by gentlemen from a distance, at very high prices. This splendid herd has all been collected by Mr. Cartwright within the last four years, and is now broken up, we understand, preparatory to his disposing of the farm on which they have been reared. The cattle showed very plainly what can be done by skill and judgment, coupled with untiring perseverance and industry; for, without exaggeration, we can safely say that Mr. Cartwright in his breeding of shorthorns has rivalled his compeers, even the oldest and most famous. It was matter of general remark by the very numerous party present, that they never saw stock look so well—and although cattle have been sinking in price of late, the prices were larger than at any sale in the kingdom of this year. Some of those sold are destined for Australia, Mr. Tyrell, agent for Mrs. Keith Faulkner, of Torquay, buying several for that purpose. The Prince of Prussia bull was bought for the Royal Agricultural College, at Cirencester. But we were rather astonished to observe that the breeders of this neighbourhood allowed so much excellent blood to leave the district; for it is but seldom that such an opportunity occurs when they can obtain really good stock at their own doors. No doubt the prices obtained were very high; but it ought always to be considered that for such good old blood as that of "Venus" (Lot 12), and "Hero" (Lot 8), an extra price must be paid. "Usurpation," a first-rate cow, sold for £110 to a gentleman from Lancashire. The Yearlings generally fetched high prices; but "Genevieve 3rd," "Augusta," and "Juanita" (who might be considered as the gems of the sale), sold at extraordinary prices for their age. The bulls, 11 in number, were admirable animals; but Lot 1, "Second Duke of Cambridge," although he sold for £147, did not realise so much as he deserved, especially when it is remembered, as stated by Mr. Strafford, in beginning the sale, that his sire, "Grand Duke," was sold for no less than 1,000 guineas.

As a proof of the wide-spreading taste for shorthorns, it may be observed that the Essex men, who have hitherto rather held aloof, were good buyers: another earnest that the seed which was sown by the Royal Agricultural Society in 1856 has not fallen on a barren soil. A new purchaser also arose in Mr. Howard of Biddenham, a brother of the celebrated implement maker, at Bedford, who carried off four of the choicest-bred things, at long prices. One of these was Lady Spencer, a twelve-year-old, and consequently a rather ragged-looking cow (whose dam was bought at Mason's sale at Chilton in 1829), bearing in her veins the blood of Monarch, who was sold for 220 gs. in very low-price times. One of her three daughters, Lady Spencer 2nd, by the 400-guinea Usurer, and whose young calf was said to have been sold that morning for 50 gs., also becomes Mr. Howard's at 105 gs. Her daughter, Lady Spencer 4th, a proof of the high quality of the Usurper heifers, was, again, the subject of very fierce competition; but the Master of the Heythrop Hunt was not to be choked off, and he got the last nod for 140 gs. Lady Spencer 1st was not so fortunate, although a very magnificent animal to look at; but owing to a general impression that she could be of no use for breeding, Mr. Cartwright lost 70 gs. on the price which he gave for her a short time since. Lady Franklin, one of the best cows in the sale, did not realise her original price by a great deal. She was by Captain Shaftoe, a Royal Show prize bull at Northampton, who was sold twice over for upwards of 300 gs. Junia was much liked, and so was her magnificent calf Juanita, by Second Duke of Cambridge; but the colour of Snowdrop, who was purchased by Lord Southampton, was not a little against her in the biddings. Genevieve, by the Second Duke of Cambridge, would not improbably have followed suit to Whittlebury, but his lordship cut it rather too fine, and the last grain had fallen from the glass in favour of the Duke of Marlborough's steward, before he renewed his bid. Grand as the Second Duke of Cambridge's stock were, the Duke himself is slightly leggy, and has hardly made up into quite the animal we originally expected; but still Mr. Phillips showed good judgment in taking him at the price into Devon, along with Lady Spencer the First, His son John O'Gaunt was a very striking animal, with a rare back and quarters, and very rich hair; and Mr. Lawford, of Leighton Buzzard, one of the last competitors for the old bull, bought him. As at the Tubney and last Quorn sales of horses, the highest prices were a bracket, in this case, of 140 guineas, between Lady Spencer 4th and the Second Duke of Cambridge.

The company present numbered at least between 200 and 300, many of them from distant counties, and the rest were the most enterprising breeders of cattle and agriculturists of the neighbourhood. Such an assembly is seldom seen in this quarter, and shows the great interest now taken in short-horned cattle. Amongst the noblemen and gentlemen were—Lord Southampton, Sir Charles Knightley, Bart., H. W. Dashwood, Esq., W. Willes, Esq., H. L. Gaskell, Esq., Kiddington Hall; Col. Bowles, J. L. Stratton, Esq., T. E., and G. Drake, Esqrs., H. Hall, Esq., the Hon. H. Noel Hill, Shropshire; Mr. Denchfield, agent to Sir Anthony Rothschild, Bucks; Mr. Mein, agent to the Duke of Marlborough; Mr. Tyrell, agent to Mrs. Keith Faulkner, Torquay; Mr. Turvile, agent to W. Bramston, Esq., M.P., Essex; Mr. Willoughby Wood, Holly Bank, the well-known agriculturist; Mr. Lowndes, Liverpool; Mr. J. O. Adkins, Milcote, Warwickshire; Mr. Topham, Warwickshire; Mr. Dodwell, Long Crendon; Mr. Bowley, Cirencester; Mr. S. Brecher, Shaftesbury; Mr. W. Smyth, Wadhurst Castle, Sussex; Mr. Lawford

Leighton Buzzard; Mr. Yorke, Thrapston; Mr. Beale, Rugby; Mr. Piggott, Essex; Mr. Atherton, Liverpool; Mr. J. Robinson, Clifton Pastures, Bucks; Mr. Christy, Essex; Mr. Howard, Bedford; Mr. Longland, Northamptonshire; Mr. Phillips, Broombury, Totnes, Devon; Mr. H. Hewers, Northleach; Mr. T. Worsey, Chapel House, Speke, Lancashire Mr. T. Robinson, Castle Ashby, Northamptonshire, &c., &c.

After the company had partaken of a substantial luncheon, they inspected the crops on the farm, which are now in a very forward state, the barley sown in December looking better than any ever seen in this quarter before; the winter beans are in flower; and the wheat, drilled three pecks to the acre, is a very promising crop. Mr. Strafford then took his place on the stand, and after reading the conditions of sale, went on to remark "that he was quite sure he need say nothing to recommend the stock to the notice of the company, for the large number of breeders and farmers he saw before him, from all parts of the country, satisfied him that when a man went the right way to work, like Mr. Cartwright, his efforts would be fully appreciated. Mr. Cartwright had done wonders during the short time he had been a breeder. The stock which he had to offer on that occasion was remarkably well bred, and those who were desirous of commencing the breed of Shorthorns had now an excellent opportunity of doing so. He believed that Shorthorns were destined to supersede every other breed. In conclusion, he begged to say that the whole of the stock would be sold without reserve." The biddings commenced, and went on very spiritedly to the end, Lord Southampton and Mr. Mein, agent to the Duke of Marlborough, bidding against each other very obstinately at times. We subjoin the lots and the prices obtained:—

COWS AND HEIFERS.

Lot 1.—Jacinth, roan, calved in March, 1846; got by Pawsley; bought for £38 1[illegible]s., by Mr. W. Hadland, of Clattercote.

Lot 2.—Flash, red and white, calved in Sept., 1846; got by Mowbray; £25 4s., by Mr. E. Parsons, of Walton Grounds.

Lot 3.—Lady Spencer, roan, calved in Dec., 1846; got by Shamrock; £68 5s., by Mr. Phillips, Broombury, Totness, Devon.

Lot 4.—Jenny Lind, red, calved March, 1847; got by Duke of Richmond; £47 5s., by Mr. Robinson, Castle Ashby, Northamptonshire.

Lot 5.—Joan, red, calved August, 1847; got by Lycurgus; £42, by Mr. Worsey, Chapel House, Speke, Lancashire.

Lot 6.—Garland, red, calved November, 1847; got by Brunswick; £38 17s., by Mr. Bowley, Siddington House, Cirencester.

Lot 7.—Pearl 2nd, roan, calved April, 1848; got by Senator, £44 2s., by Mr. H. Hewer, Northleach.

Lot 8.—Hero, roan, calved May, 1848; got by Son of the Baronet; £28 7s., by Mr. W. Caless, Bodicote House.

Lot 9.—Day's Eye, roan, calved May, 1849; got by Young Fourth Duke; £60 0s., by Mr. Howard, Bedford.

Lot 10.—Lady Spencer 1st, roan, calved June, 1850; got by Marquis of Rockingham; £42, by Mr. Phillips, Broombury, Totness, Devon.

Lot 11.—Pearl 4th, white, calved October, 1850; got by Benedict; £48 6s., by Mr. Howard, Bedford.

Lot 12.—Venus, red and white, calved June, 1852; got by Grand Duke; £105, by Mr. H. Hall, Barton.

Lot 13.—Lady Franklin, red, calved July, 1852; got by Captain Shaftoe; £70 7s., by Mr. W. Caless, Bodicote House.

Lot 14.—Accession, roan, calved June, 1853; got by Filbert; £31 10s., by Mrs. Keith Faulkner, Torquay.

Lot 15.—Pearl Powder, red and white, calved October, 1853; got by Buccaneer; £36 15s., by Mr. Longland, Northamptonshire.

Lot 16.—Fashion, roan, calved November, 1853; got by Daybreak; £52 10s., by Mr. Avery.

Lot 17.—Lady Spencer 2nd, roan, calved November, 1854; got by Usurer: £110 5s., by Mr. Howard, Bedford.

Lot 18.—Genevieve 1st, red and white, calved December, 1854; got by Usurper; £55 13s., by Mr. Christy, Essex.

Lot 19.—Jocose, red and white, calved March, 1855; got by Usurper; £73 10s., by Mrs. Keith Faulkner, Torquay.

Lot 20.—Junia, red, calved April, 1855; got by Duke of Gloster; £95 11s., by Mr. J. Robinson, Clifton Pastures, Bucks.

Lot 21.—Usurpation, roan, calved October, 1855; got by Usurper; £110 5s., by Mr. Atherton, Liverpool.

Lot 22.—Lady Spencer 4th, roan, calved December, 1855; got by Usurper; £147, by Mr. H. Hall, Barton.

Lot 23.—Genevieve 2nd, red and white, calved Jan. 21, 1856; got by Usurper; £75 12s., by Mr. Piggott, Essex.

Lot 24.—Jilt, roan, calved March 18, 1856; got by Usurper; £105, by Mr. H. Hall, Barton.

Lot 25.—Johanna, red, calved June 25, 1856; got by Usurper; £34, by Mr. J. Robinson, Bucks.

Lot 26.—Adelaide, red and white, calved Oct., 1856; got by Usurper; £88 11s., by H. L. Gaskell, Esq., of Kiddington Hall.

Lot 27.—Violet, red and white, calved Nov., 1856; got by Usurper; £73 10s., by Sir Anthony Rothschild, Bucks.

Lot 28.—Princess Royal, roan, calved Feb., 1857; got by Usurper; £43 1s., by H. L. Gaskell, Esq., Kiddington.

Lot 29.—Jessica, red and white, calved Feb., 1857; got by Usurper; £59 17s., by Mr. Howard, Bedford.

Lot 30.—Proserpine, roan, calved March, 1857; got by Brilliant; £63, by Mr. Piggott, Essex.

Lot 31.—Snowdrop, white, calved March, 1857; got by Brilliant; £58 16s., by Lord Southampton, Whittlebury.

Lot 32.—Genevieve 3rd, red and white, calved July, 1857; got by Second Duke of Cambridge; £110 5s., by the Duke of Marlborough, Blenheim.

Lot 33.—Augusta, roan, calved Sept., 1857; got by Second Duke of Cambridge; £84, by Lord Southampton.

Lot 34.—Juanita, red and white, calved Sept., 1857; got by Second Duke of Cambridge; £85 1s., by Mr. H. Starkey, Spy Park, Wilts.

Lot 35.—Dewdrop, roan, calved March, 1858; got by Second Duke of Cambridge; £34 13s., by Mr. Starkey, Wilts.

BULLS.

Lot 1.—Second Duke of Cambridge, red, calved April, 1854; got by Grand Duke; £147, by Mr. Phillips, Totness, Devon.

Lot 2.—Flamer, red and white, calved August, 1856; got by Usurper; £28 7s., by Sir Anthony Rothschild, Bucks.

Lot 3.—Potentate, red, calved Jan., 1857; got by Usurper; £32 11s., by Mr. Beale, Rugby.

Lot 4.—Forester, red and white, calved June, 1857; got by Second Duke of Cambridge; £43 1s., by Mr. H. Clarke.

Lot 5.—Firebrand, red and white, calved June, 1857; got by Second Duke of Cambridge; £38 17s., by Mr. Yorke, Thrapston.

Lot 6.—Freebooter, red, calved August, 1857; got by Second Duke of Cambridge; £82 11s., by Mr. Painter, Worton.

Lot 7.—John o'Gaunt, red, calved August, 1857; got by Second Duke of Cambridge; £110 5s., by Mr. Lawford, Leighton Buzzard.

Lot 8.—Don Juan, red, calved August, 1857; got by Second Duke of Cambridge; £35 1s., by Mr. W. Smyth, Wadhurst Castle, Sussex.

Lot 9.—Jester, red and white, calved Sept., 1857; got by Second Duke of Cambridge; £49 7s., by Mr. Stephen Bracher, Shaftesbury

Lot 10.—Lord Althorp 3rd, red, calved Dec., 1857; got by Second Duke of Cambridge; £56 16s., by Mrs. Keith Faulkner.

Lot 11.—Prince of Prussia, red roan, calved Jan., 1858; got by Second Duke of Cambridge; £37 16s., by Mr. Bowly, Cirencester.

The total realized by the cows and heifers was £2,290 1s. giving an average of £65 8s. 7d. The bulls fetched £641 1s., and an average of £58 6s. 5½d. The grand total proceeds of the sale was £2,931 2s., which gives an average of £63 14s. 7½d.

After Mr. Cartwright's sale had been concluded, six shorthorns, bred by P. S. Punnett, Esq., Chart Sutton, were sold by Mr. Strafford, as follows:—

Lot 1.—Young Mary, red and white, calved in 1850; got by Man of Kent; £35 14s., by Mr. Chamberlin, of Adderbury.

Lot 2.—Roan Crummy, rich roan, calved in 1851; got by Man of Kent; £32 11s., by Mr. Bowley, Cirencester.

Lot 3.—Young Spectator, roan, calved in 1852; got by Murton; £34 13s., by Mr. Caless, Bodicote

Lot 4.—Torrington, roan, calved in 1852; got by Man of Kent; £29 8s., by Mr. Willifer, King's Sutton.

Lot 5.—Young Humpsey, roan, calved in December, 1853; got by Murton; £29 9s., by H. L. Gaskell, Esq., Kiddington.

Lot 6.—Locket, white, calved in April, 1855; got by Highland Laddie; £26 5s., by Mr. W. Smyth, Sussex.

The total amounted to £187 19s.; and the average, £31 6s. 6d.

EXPERIMENTAL FARMS IN AUSTRALIA.—It is with great pleasure that we take cognisance of the appointment of Mr. Skilling to the office of Director of the Experimental Farm, to which a portion of the Government grant in aid of agriculture has been devoted. We feel convinced that this accord to the wishes of our farming community will be gratefully received, as it tends to prove that those in authority are really anxious for the success of the scheme propounded. Mr. Skilling has, for some time, been the industrious and efficient secretary of the Port Philip Farmers' Society, and by constant contact with our leading agriculturists has become so thoroughly acquainted with their views, and their pursuits, that he is singularly qualified for the post he is now called upon to fill. Had the original idea of *Importing (!)* a director from England been carried out, however good a practical or theoretical husbandman he might be, it would have been years before he could have proved himself thoroughly a master of the peculiarities of our soil and climate as to become useful to the colony at large. In place of teaching, he would have to learn from the very farm servants who might already be acclimated, and, however anxious to do his duty, must have necessarily found himself a temporary stumbling-block, instead of assistance, to our already rapid advancement. We are not aware if the Port Philip Farmers' Society will immediately lose the services of their able secretary, though we should imagine so; but, much as the removal will be regretted by those to whom he has been so faithful a colleague, we are sure that the extended means of usefulness thus opened to him will be hailed with gratification, as a reward due to merit, and also as a handsome compliment to the society itself. When the question of the grant was first mooted, Mr. Skilling penned an able memorial to Captain Clarke, setting forth the advantages to be gained by a model farm, and in a full, but concise manner, explained the objects to be desired, and the most feasible method of carrying them out. The plan of a museum he also broached, and particularly impressed on the government the mutual economy and benefit to be acquired by a reformatory school attached to the institution, an idea which it were well to embrace. The almost unexpected recognition of his valuable advice, and in so highly complimentary a form, will, we doubt not, be a spur to Mr. Skilling's future exertions, and we shortly hope to see him prove as able in practice as precept.—*Bell's Life in Victoria.*

THE REARING AND DISEASES OF LAMBS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—On reading your report of the discussion on the rearing and diseases of lambs at the Farmers' Club, I find that several gentlemen have sustained great losses amongst their lambs, but none have been able to supply a remedy. I have therefore been induced to send you the result of my own experience, in order that others may benefit from it, if they choose to use the remedy, which is both simple and inexpensive, and in my own case effectual.

In the beginning of April, 1852, my lambs were affected much in the same way as the Chairman describes his to have been. The first symptoms (where they were observed) were, a wandering listless gait, with the head down, and the mouth in motion as if eating; when, suddenly, they would make a start, stagger a few steps, then fall down and struggle violently for a short time, foaming at the mouth and gnashing the teeth as if in great pain. These paroxysms with some of them lasted but a short time—death eased their pain; and, almost invariably, with death came what was termed the scour. In others it appeared with less violence, and some I had lingered for days before they died. With these I tried every remedy I could think of, or that was suggested to me; and, unfortunately, I had cases enough to try everybody's remedy. But all were alike unavailing, and the disease was stopped at last by weaning, and at the same time spoiling those that were left. I find, on reference to notes made at the time, that from the beginning to the 23rd of April (the time of weaning) I had lost 80 out of 800 lambs. The stomachs of several of the lambs were examined by two veterinary surgeons without any satisfactory result. I should state, perhaps, that during these three weeks of mortality, in hopes of checking the disease, the flock was moved from old or early sown swedes to younger ones that had been pulled up and put in rows across the field, and the ground ploughed between; so that it was impossible they should have picked up any weed to occasion the disaster. Next they were put on young turnip greens, and after that on ryegrass, until, on the 23rd, they were taken from their mothers and kept on dry food for a few days, weaned, and spoiled; but the disease was stayed. From this I felt convinced that the injury was derived from the ewe, and that it was she who required medicine; and, having seen in "Clater's Cattle Doctor" that two ounces of Glauber's salts, with a quarter of an ounce of carraways, mixed with thin gruel, was a good aperient dose for a sheep, I resolved to give it a trial, which I had an opportunity of doing the following year; and, as I believe, prevented a repetition of the previous year's loss, as the same symptoms, attended with the same fatal result, had shown in one of the best lambs (which I think is often the case): upon which I procured a quantity of salts and carraways, and drenched all the ewes in the flock, excepting six which had not lambed at the time; and the only lamb I lost in a similar way afterwards was from one of these six ewes.

The way in which I prepare the dose is this: I first boil the carraways in order that the extract may be equally administered, which it would be more difficult to do with the seeds. When the carraways are sufficiently boiled, add cold water enough to make as many half-pints as there are sheep to be drenched; then add the salts (two ounces to each half-pint), which, when dissolved, I give to the ewes from half-pint bottles, which a boy or girl will fill as fast as five or six men will get them emptied by drenching the ewes.

I am afraid, Sir, that my communication has extended to too great a length; but I have endeavoured to be as concise as possible, and have only said as much as I thought was necessary in order to be understood, and I must trust to your advocacy of the agricultural interest to plead my apology.

I remain, Sir, your obedient servant,

Burghclere, May 14th, 1858. ROBERT CHURCH.

THE DISEASES OF LAMBS.

Sir,—I have read the discussion at the Central Farmers' Club published in your paper this week, and find that some farmers have lost a number of lambs in a short time. Having had some practice in this matter, and knowing the cause of death and the cure, I will tell it you for the benefit of my brother-farmers. It is caused by a feverish milk from the ewe. The cure is 1 oz. of salts to each ewe, and good keeping. If a single death happens after this, another ounce per ewe must be given. I have proved it. To keep well, without cooling the blood of the ewe, is certain death to an increased number of lambs.

I am, Sir, your obedient servant,

Woolston, Bletchley Station, May 11*th.* W. SMITH.

SOMETHING OF PLANTS, AND HOW THEY LIVE.

Plants feed themselves. They increase in stature because of nourishment. They receive what is required, and discharge from their roots what is not required, to assist their growth. What are plants made of? If every farmer could answer this question, and then provide the pet plant with such matter as it requires in the manufacture of itself, he would disperse a mist in which at least nine-tenths of our farmers are bewildered. Burn any dry vegetable matter. What becomes of it? You see nothing but ashes. This is not all of it. The balance has become dissipated in the atmosphere. That part which is nowhere—which has escaped in the air, or burned away, is the *organic* part—the ashes the *inorganic* portion. Where did this plant come from? "Dust thou art, and unto dust shalt thou return." The part become air must have originated in air; while the ashes have become earth, and originated in the soil. The *organic* part is air, the *inorganic* matter earth. Remember it. Nothing is lost. There has been no annihilation—only a change of form. The *organic* matter, which has burned away, consists of *carbon, oxygen, hydrogen,* and *nitrogen. Carbon* is a solid (charcoal), and the last three named are gases. Carbon exists in all plants, and in combination with these gases constitute nearly the whole of most plants, ashes bearing but a small proportion to the whole. Carbon constitutes about half the dry weight of plants. *Oxygen* supports combustion. It unites with many substances. It is sometimes called *vital air,* because necessary to respiration. Oxygen and carbon form carbonic acid, and united with hydrogen forms water. When united with iron, the iron becomes rusty. This rust is called oxide of iron. Oxygen united with nitrogen forms nitric acid. The two also compose atmospheric air; and here witness the wonderful adaptation of the works of creation to each other! If the atmosphere was pure oxygen, every living thing would soon decay of combustion; but adding to one part of oxygen four parts of nitrogen, God has so diluted the exhilarating gas, as that in its place we have a delicious life-giving and life-preserving nectar—so pure and palatable that we never cease to thirst for it, yet the supply is ample. But there are other elements in the atmosphere which the lungs of plants receive, and yet they are called impurities. We have seen farmers for the want of the proper knowledge apply certain compositions to a soil, when, instead of benefiting the plant, it drove away, and dissipated all that was giving life to it. We have seen *ammonia,* one of the impurities above alluded to, allowed to escape from a manure heap, because of the want of the proper application to fix it there. *Carbonic acid, water,* and *ammonia* are all essential to the maturity of most vegetables. *Carbonic acid* is the most important in its relations to plants, for from this source alone is their carbon obtained. It consists, as has been said, of *carbon* and *oxygen.* It is remarkable as being the first gaseous substance recognized after atmospheric air. Dr. Black, in 1757, called it *fixed air,* because he found it fixed in common limestone and magnesia. Plants, as we have before said, receive nourishment through their roots, and by their leaves. Carbon enters in the water by the roots, and is absorbed from the air by the leaves. Since carbonic acid is the source of supply of carbon only, to the plant, the *oxygen* must be separated from the carbon, and sent off into the atmosphere. The gum portions of the plant exhales the oxygen under the influence of sunlight. Sunlight is essential to the decomposition of carbonic acid, and to the rapid growth of plants. When a plant decays, the carbon in the plant unites with the oxygen in the air, and becomes carbonic acid. The same is the result where bodies burn. In the consumption of food and respiration, you are manufacturing and throwing off carbonic acid, which goes to assist again the formations of food for yourself or your dependants. Carbon then is certainly in a transition state, and though it constitutes so large a part of all vegetable and animal matter, yet it is all derived from the small amount of carbonic acid in the atmosphere; and but for this constant change and exhalation of both plants and animals, the supply would be exhausted. The fire in your kitchen is constantly supplying the trees and vegetables near your door with carbonic acid, which if exposed to the sun decomposes rapidly, and hence makes a rapid growth. The tree near your dwelling, though no better than the one planted at the same time, in the same manner, and in equally as good soil, in the orchard fifty yards distant, is far outstripping the orchard tree in growth—simply because it is fed with more carbon. Trees are necessary near the house; and in large cities, every man who understands the laws of nature and of health will provide these absorbents for the extra amount of acid generated. We frequently find in cities the leaves of plants rapidly forming, while in the country the twigs are as bare of foliage as at mid-winter. We should not be misunderstood. Carbon enters the plant in the form of carbonic acid. The *carbon* is retained until the plant decays, but the oxygen is thrown off to unite with carbon again. Carbon is *fixed* in the plant until decay commences. The blood of animals, which contains carbon, unites with the air, or the oxygen of the air, as it is inhaled into the lungs, and forms carbonic acid, without which process no animal could live. This carbonic acid is thrown off, and feeds plants, which in turn feed animals again.

We have said carbon is a solid, or, in other words, *charcoal* is a solid. It is light and porous, hence a good absorbent. This is the secret of its value to the farmer. It absorbs gases that may escape from plants or decomposing substances. It separates from water any impurities, decayed animal matter, and purifies it. Hence, too, its value as a filter. It is of great value to the field, whether mixed with the soil or applied on the surface. It absorbs largely at common temperatures, and when heated by the sun, yields up its atmospheric treasures to assist the growth of plants and vegetables. You remember the coal beds on the old farm "down East," where, no matter what the season, or its effect upon the balance of the crop, you were sure to find well-matured corn, a large growth of plump wheat, heavy oats, or enormous melons, within the area of the coal bed. Can you recal a time, a season, when there was not a marked difference between the products of the coal-bed and the rest of the field? Had you ever investigated the subject? You remember to have planted cucumbers and melons in your garden, and to have heard some one, noted for his success in growing these luxuries early and large, say that charcoal was a capital manure. You may have tried it with success; but why were you content with the result? Why not seek for the reason? How many lose the benefit of an extended application from the want of a spirit of inquiry! We hope the Farmers' Clubs will provoke and develop INVESTIGATION.

Charcoal absorbs offensive odours. Mix it with night soil, and it makes it dry and portable. Saved and applied, this is rendered a most valuable manure. Charcoal has great preservative qualities. It will keep meat pure and sweet a long time; and who has not tried its effects in the preservation of the potato? Who ever saw a *watery* potato grow on a coal-bed? Who ever saw *small* ones grow there? We never did. Mix it with musty grain, if you have any, or impure meat, and tell us of its effects. Pack meats and vegetables in it, and they will not soon decay. It is a most unchangeable substance; hence posts, charred at the bottom, do not decay as soon as otherwise when set in the ground. Liquids passed through it lose their colouring and bitter or astringent flavour. Sugar refiners decolourize their brown syrups with its assistance.

Thus, while we have not strictly departed from the text, we have given you some facts which may be of great value to you. We have deviated from our intended course, but our aim is to make these articles as plain, practical, and valuable as possible.

Remember that we have said, the *organic* portion of plants consists of *carbon, oxygen, hydrogen*, and *nitrogen*. Water is composed of *hydrogen* and *oxygen*. Then water feeds the plant with these two gases, Burn the plant, and these gases escape in the form of vapour, which, condensed, falls to the earth as rain. You may desire to know something of the character of these gases abstractly. *Oxygen* is heavier than the atmosphere; it is a colourless gas, has neither taste nor smell; inhaled by animals, its effects are exhilarating and exciting. We have seen it given to individuals for the purpose of exhibiting its effects upon their action. In some cases the most extraordinary movements are made. It is, of course, injurious, and were we to inhale only *oxygen*, we would soon be unable to inhale *anything*. About one-fifth of the air, one-third of the ocean, and one-half of the solid earth are *oxygen*.

We extract the following passage from one of Johnston's lectures: "But the quantity of this substance, which is stored up in the solid rocks, is still more remarkable. Nearly one-half of the weight of the solid rocks, which compose the crust of our globe, of every solid substance we see around us—of the houses in which we live, and of the stones on which we tread; of the soils which you daily cultivate, and much more than one-half of the weight of the bodies of all living animals and plants—consists of this elementary body, *oxygen*, known to us, as I have already said, only in the state of a gas. It may not appear surprising that any one elementary substance should have been formed by the Creator in such abundance as to constitute nearly one-half, by weight, of the entire crust of the globe; but it must strike you as remarkable, that this should also be the element on the presence of which all animal life depends, and as nothing less wonderful, that a substance, which we know only in the state of thin air, should, by some wonderful mechanism, be bound up and imprisoned in such vast stores in the solid mountains of the globe, be destined to pervade and refresh all nature in the form of water, and to beautify and adorn the earth in the solid parts of animals and plants. But all nature is full of similar wonders; and every step you advance in the study of the principles of the art by which you live, you will not fail to mark the united skill and bounty of the same great Contriver."

Oxygen supports combustion, and all substances which burn in the open air burn in *it* (*oxygen*) with far greater brilliancy. We have said that plants exhale *oxygen* under the influence of sunlight, and we suggest a simple experiment by which this exhalation may be made perceptible.

Let a sprig of mint be placed in a white glass globe, which is then to be filled quite full of spring water, and the mouth inverted in a tumbler of water, it is then to be placed in the direct rays of the sun, and in a short time bubbles of gas will be seen collecting in the upper part of the glass, which is nearly pure *oxygen*.

Hydrogen is fourteen times lighter than the atmosphere and sixteen times lighter than oxygen, being the lightest substance known. It is combustible, but does not support combustion. The affinity of oxygen and hydrogen is very great, yet they do not combine spontaneously. Hydrogen is colourless, and does not support life. Animals die and plants wither when introduced into it. It is not necessary to the growth of plants. United with oxygen, it becomes water or the protoxide of hydrogen. Water is an essential to the plant, but Nature has provided an ample supply. It is our province to regulate and modify this supply. Irrigation at the proper time is an immense stimulant, or, more properly, fertilizer. But our *best* soils, the most durable and reliable, require drainage, and provision for feeding the plant with *only* the amount of water needed, and disposing of the surplus. We need write no "apostrophe to water." It may be of use and abuse. It *is* both used and abused. Let us learn to use it.

Next in order of the *organic* portions of plants is *nitrogen*—one of the most important *organic* constituents of vegetable matter. It constitutes about four-fifths of atmospheric air. Animals cannot live in it alone, yet they cannot be matured without it. Plants die in it, yet it is necessary to their growth. Reference has already been made to its use to dilute the oxygen of the air, so as to render it palatable and life-giving. Its existence has been known since 1772, and it was recognized as a constituent of the atmosphere in 1775. It does not support combustion, but extinguishes all burning bodies immersed in it. It is not inflammable. It is generally supposed that plants get no nitrogen from the air. Johnston says, "Spring and rain waters absorb it, as they do oxygen, from the atmospheric air, and bear it in solution to the roots, by which it is not unlikely that it may be conveyed directly into the circulation of the plants." But plants are mainly fed by nitrogen through some of its compounds. *Ammonia* is one. It is composed of nitrogen and hydrogen. Seventeen pounds of *ammonia* contain about fourteen pounds of nitrogen and three pounds of hydrogen. It is important to the growth of the plant—one of the most important compounds. It is common—every farmer has to do with it and daily witnesses its effects, is made aware of its presence by his senses, yet scarcely heeds its value, and often regards it as a very noxious vapour which ought not to exist. But it does exist in the atmosphere everywhere where animal or vegetable matter is decaying. It is about three-fifths as heavy as atmospheric air. Our readers will recognize it as spirits of hartshorn, and it is sometimes called alkaline air, or volatile alkali. It is colourless, does not support combustion, and is inflammable. Here is another wonder for you, reader—a combination of two colourless and tasteless gases and without smell, in the proportion of 14 and 3 produces another gas that has pungent smell and a very perceptible taste. And is it not more wonderful, that it should exist, and enter so largely into all the successes and reverses of the farmer's operations, become part of his stock-in-trade, and yet create no inquiry into its properties, no curiosity as to its use or value? It is escaping yonder from that manure heap, from the liquid steaming excrements of your cattle. Here again you witness the value of absorbents to mix with animal manures. Charcoal or muck absorbs largely and should be largely used. Water absorbs ammonia over 700 and nearly 800 times its bulk of it, and is made the medium to transfer the ammonia of the atmosphere to the growing plants. Ammonia is powerful in its effect upon the plant. It promotes its luxuriance and growth. It is mainly and perhaps wholly taken up by the roots of the plant from the soil, not being inhaled by the breathing leaf as is carbonic acid.

Liebig says, "The effect of an artificial supply of ammonia as a source of nitrogen is to accelerate the growth and development of plants." And he attaches great importance to this fact, and argues that it should be taken into account in gardening—especially in kitchen gardening, and as much as possible in agriculture on a large scale, when the time occupied in the growth of plants is of importance, as it is most certainly in our latitudes. Indeed it is the most valuable fertiliser contained in farm-yard manure, and it exists to a greater extent in the liquid part than in the solid excrement. And yet farmers—the great majority of them—provide no means for conveying this important fertilizer to the plant.

The stable manure may be thrown out under the eaves of the stable, and into the street, with no absorbing mixture. The eaves of the stable have no fixtures to convey the water into a cistern for the use of the stock, but the dripping flood inundates the manure heap, and leaches away into the street ditch, to be turned perhaps by a shrewd neighbour, if one happens to live lower down a declivity, into his own fields by a furrow or five minutes' use of the spade, and irrigates *his* fields, furnishing his crops with a wealth of nutriment and stimulant—the *gold* of *your* manure. We have seen it done. We are not imagining anything. The same principle applied to commerce would ruin every man who indulged in it. Suppose the merchant should throw *gold* into the street, and depend upon the silver or currency received for profits, and to replace and replenish his stock; what would be thought of him? Does a farmer *know* these facts—know he is losing the *best* of his resources for the replenishment of his farm, and still neglect to take measures to retain them? Cannot *afford* to provide against this waste? If God had not blessed us with a land unrivalled in fertility, and had not provided in nature compensation for the consumption of plants, man, if left alone, would soon impoverish himself, and the earth would become barren and unfruitful.

Ammonia does not enter the plant by inhalation (if we may use the term) through the leaves. It is a gas, but there are few plants that do not require it to knock for admittance at the roots, and in company (solution) with water; and here again we must urge your attention to the saving the *liquid* manure of your stock, so full of nitrogen for the plant. It has been suggested to leave the stable floor open, with a muck-bed under it, to receive the leakage. Another plan is, to have a close floor, and litter the stable behind the stock with muck, sawdust, or tanbark-charcoal. And here we wish to say one word upon the use of muck as an absorbent. Ignorant once of the philosophy of composting, we helped a man, *then* considered more progressive than his neighbours, to clean out a swamp of its muck deposit—a purely vegetable substance. It was thrown around an orchard at once—at the roots of each tree. It had its effect, it is true; the trees grew marvellously. But, if instead of depositing it thus to "save handling," it had been hauled to the large shed in the barn-yard, and then mixed with the stable manure, which was evaporating, and leaching under the eaves on the south side of the barn, we would have *saved* enough by the operation to have paid the expenses and produced more wonderful effects still. Why? Because that muck was pure and (almost) unadulterated carbon—the best of absorbents, and that is *why* we urge composting with it; it saves for the use of the plant the ammonia in the manure mixed with it. Attend then to this matter, and save the *liquid* portion of the manure in your yards and stables.

Deep ploughing has to do with the production of ammonia. It enables the roots of plants to penetrate and fill the subsoil with vegetable matter, which, by its decay in the confined atmosphere, where the access of the oxygen of the air is not easy, gives rise to the production of ammonia. When thus formed, it is chemically prepared, and enters the roots of the bearing plant to assist its growth. We said, the ammonia of the atmosphere is absorbed by rain, dews, &c., and returned to the roots; hence, the necessity of rain and dews—the latter particularly, where vegetation is rankest and growing most rapidly, requiring continual supplies of nitrogen. Who can estimate the value of a heavy body of snow during four months of the year succeeding a fruitful season? Here is matter for inquiry and reflection, fellow farmer. How wonderfully accurate is the action of God's great laws of compensation—of supply and demand!

We have hitherto been talking of the *organic* parts of plants—those parts that burn away, of which nothing visible remains after combustion. Those parts which remain in the form of ashes are called the *inorganic*—are derived by the plant from the earth, and when the plant is decayed become earth again—were obtained from the soil, and have become soil again by combustion. The inorganic parts of plants are in small proportion to the organic, and yet they are numerically greater.

Let the reader remember that carbon, oxygen, hydrogen, and nitrogen are the four kinds of matter comprising the greater and organic portions of plants; and yet the inorganic portion, though smaller, consists of nine or ten different parts. We are now to consider these. We may learn something new, and digressions will be in order if we find it for the interest of the reader to extend our science to its practical application. It involves the manure question at every point, and here we may discover, possibly, whether the rich and so-called *exhaustless* (*!*) virgin soil of the prairies, will need to be prostituted by the application of the *foul stuff* called barn-yard manure.

Burn a plant, a mass of weeds, a stack of wheat or other straw, reader, and how little of it is left! this you have noticed. How small in proportion to the bulk consumed, and the bulk of ashes that remain! This is the inorganic part; very seldom amounts to twelve or fifteen per cent. of the weight of the vegetable substance burned. If it be straw you have burned, the weight of the ashes will seldom exceed four or five per cent. of the weight of the straw consumed. Yet this part of the plant is as important as any other, comes from the soil and must exist in the soil, so that the plant may take up the proportions required in its structure—in its growth.

Burn a ton of straw, weigh the ashes, and you, who return nothing to your fields in the shape of manure, estimate the amount of inorganic matter you take from your farm annually, saying nothing of the ashes, or inorganic part of the grain the straw yields. How long can you continue to crop your land without impoverishing it, by this no-return process? We want you to have time to ponder upon the figures you may make, by calculating that five per cent. of every ton of wheat-straw you take from your farm is actually taken from the soil, and must be supplied in some manner, and if you are not supplying it, you are growing poorer. Let the figures tell you how fast you are growing poorer. When you have aroused yourself from the stupor of insensibility, you will be in fit mood to search into the character of these several inorganic parts of plants; for it is not regarded by moderns as "stealing trash" to steal our *purse*.

Having sufficiently pondered on the amount of inorganic matter taken from the soil in every ton of straw, and which must be replaced or the soil is constantly impoverished, let us inquire what are these inorganic parts? Potash is an alkali—one of the four alkalies found in the ashes of plants. It is found in most plants. Fill a barrel with wood ashes, and leach with water—the *ley* contains the potash of the ashes. The pearlash of commerce is only potash and carbonic acid, a union of the two produced by the exposure of the former to the air, and if the quantity of carbonic acid is increased, saleratus is the result.

Many of our readers, perhaps, have had experience in the manufacture of pearlash. In early days, when the heavy forests of the North and East were being cleared, it was no unusual thing for the settler to turn a penny by the rustic manufacture of this alkali into an article of commerce. We have not unfrequently found it in the large open fire-places of the borderers, and secured it for the good dame's use, by using the "poker" among the ashes.

Plants, trees, and animals require potash in their construction. Hence it must be found in the soil, and supplied if cropping has diminished the supply.

The importance of this supply in the soil will be seen when the reader understands that every acre of wheat absorbs over thirty-two pounds of potash from the soil, barley over sixty-eight pounds, red clover over one hundred and forty-four pounds, and other common crops in different proportions. How is it to be supplied? Remember this is only *one* of the inorganic parts that you exhaust in this quantity from each acre of soil grown in wheat, barley, clover, &c., annually. Is it not a great exhausting process? Is there no necessity for supplying this food, of ploughing deeper, of manuring more? If your soil is wanting lime, ashes may be substituted. But this supply of inorganic matter in some form *must not* be withheld from your farm. It is a great study to learn how to economically supply it—of great importance you should learn. Potash may be used on sandy soils with good effect, and is a valuable application as a top-dressing for young plants, *for insects do not like it.*

Soda is another alkali found in the ashes of plants, and is not unlike potash in its office in the construction of the plant. Common salt contains it; hence the application of this *thistle-killer*—salt

—to the soil furnishes soda for the plant, and is often the best application that can be made; this, however, is a disputed question. In passing, we wish to say that *brine* is a great vermin antidote, and if carefully applied to the soil and to the compost heap will do quite as much good as harm. Caustic soda, produced by boiling the common carbonate of soda with quicklime, is dangerous to the vegetable. Common salt and lime mixed together and used in composting is very valuable as a supply of soda, for the plant is thus obtained.

Lime. The reader may perhaps consider himself posed in reference to this alkali. But its importance to the plant is oftener under than overestimated, and it is often blindly applied, and often not applied at all when it should be. It sweetens the soil, decomposes vegetable matter, and as a sulphate is a good absorbent of the different gases. But the importance of this inorganic part of the plant to the agriculturist must be the subject of another chapter.

Phosphoric acid, although combining with any of the alkalies, is most important when compounded with lime. It is composed of phosphorus and oxygen. The white smoke of a match when it is ignited is phosphoric acid, created by the union of the phosphorus on the end of the match with the oxygen of the atmosphere. Its importance will be understood when we tell you it forms nearly one-half of the ashes of wheat, rye, oats, buckwheat, barley, peas, beans, &c., and enters largely in the perfection of vegetables and animals; and yet it is found in limited quantities in most soils, particularly those where cultivation has not been remunerative—where the whole system has been to get all possible, and pay nothing to the soil for its harvests.

This acid does not exist in nature in a free state, and hence, isolated, does not affect vegetation; but as we have said, it unites with the alkalies and forms phosphates, which *are* essential to the growth of the plant, without which, perfection in the development of grains and roots cannot be obtained. It is solid and colourless, soluble in water, sour, corrodes and destroys animal and vegetable substances. It is found in combination in all plants, hence its necessity to them as an article of food; and yet it must be diluted or mixed, hence the double importance of the different alkalies as fertilizers.

The intelligent, thoughtful reader will not wonder at the constant diminution of fertility in cultivated—aye, *skinned* soils. What debts would some farmers have to pay, if the earth were to make the demand to each one, "Pay that thou owest," in the shape of inorganic matter taken from their farms, and never returned! It is estimated that in every hundred bushels of wheat sold, there are removed permanently from the soil on which it grew, sixty pounds of phosphoric acid! and that for each cow kept on a pasture throughout the summer, there are carried off in veal, butter, and cheese, not less than fifty pounds of phosphate of lime, of which perhaps nearly or quite one-fourth is phosphoric acid.

Warring says well, "This would be *one thousand pounds* for twenty cows; and it shows clearly why old dairy pastures become so exhausted of this substance, that they will no longer produce those nutritious gases which are favourable to butter and cheese making." We may as well quote the next paragraph, and endorse it, viz.: "That this removal of the most valuable constituent of the soil has been the cause of more exhaustion of farms, and more emigration in search of fertile districts, than any other single effect of injudicious farming, is a fact which multiplied instances most clearly prove."

He instances the once world-renowned wheat-producing Genesee Valley. It is well known that its fame as a wheat country does not belong to the present. And yet how many of the Western farmers, or Eastern either, can tell to-day what phosphoric acid is, or that such matter exists? They have as little idea of it, its importance to the soil, its character, and how it is found, as they have of the size of brain of the inhabitants of the planet Saturn; and how willing to let their children grow up in the same sort of ignorance, and with the same indifference to what grows, and what causes it to grow! They want them to read, write, and cipher—it was the *schooling* they had, and they get along!

O fellow farmer, insist upon that boy and girl of yours knowing something of this earth, beside its shape, diameter, and circumference, and who circumnavigated it. Require that the teacher should at least know something of plants this summer; be capable of teaching your child the beauties, peculiarities, and office of plants and flowers—in short, insist he must know something of botany. But we have left *the* acid, though we may have exhibited some acidity; if so, we cannot help it, for we feel very much like scolding at the indifference manifest to these important departments of education.

Phosphoric acid is indispensable then; it must exist in some form in the land. If you want intelligent animals, they must be fed with plants containing phosphoric acid, for phosphorus is contained in and is necessary to the health of the brain. We have said enough perhaps to set you thinking, to prove the importance of this acid in agriculture. In combination with alkalies we shall have more to say of it hereafter.—Emery's Journal of Agriculture.

AUXILIARY MANURES.

The farmers of this country have become so much accustomed to the use of guano, superphosphate of lime, and other light manures, that they would find themselves in a difficult position for a time if they were called upon to do without them. There is nothing, however, at present to indicate that they will be brought into such a position. These manures are offered in great abundance. The stores of Peruvian guano in this country are double what they were last year; and great efforts have been made by importers and manufacturers to insure abundant supplies of phosphatic manures.

But the price of these auxiliary manures is now so high in comparison with the value of farm produce, that farmers are dubious about applying them as freely as in bygone seasons.

The question as to the profitable application of guano at its present price, as a top-dressing for the cereal crops, does not admit of a general answer. It depends on the condition of the land, and other circumstances. On rich land the extra manure may cause the crop to fall down, if the season be wet; and the quality of the grain may be depreciated without the quantity being increased: but in the case of land that is well cleansed and in a middling state of fertility, we believe that it may still be applied with a fair chance of profit. Four additional bushels of wheat or eight of oats may reasonably be expected from each cwt. of guano. This quantity of grain, with the fodder, may be worth from twenty to twenty-five shillings; and as the top-dressing, including labour, does not cost more than fifteen shillings, the profit looks respectable on paper. It seems high enough to cover the climatic uncertainties, which the farmer is taught by experience not to overlook in his calculations. And the additional quantities of grain and fodder do not show the entire profit that results from the use of the guano. In the upland districts, two cwt. of guano per acre will make the oat crop eight or ten days earlier, and this may lead to a better harvested, as well as a better filled and more productive crop. There is another marked advantage in the more vigorous growth of ryegrass and clover among wheat or oats which have been top-dressed. On heavy land a free-growing clover plant may soon get beyond the risk of serious injury by slugs, when a weakly plant would be destroyed.

There have been loud complaints against the Peruvian government and their agents, because they have drawn up the price of guano to the highest rate at which they can command a sale. These complaints can be of no avail, and it is futile to indulge in them. The Peruvian government have virtually a monopoly; and in exacting the highest price which they can freely obtain, they are merely doing what other people would do in similar circumstances. If the price of grain continue to have a downward tendency the price of guano must be lowered also, as the point may soon be reached at which there can be little chance of profit to the farmer from using it. But it is lost labour to assail the monopolists, as some people do, by advising farmers to abstain from purchasing guano, as long as they expect to derive profit from its use.

One good result has followed the high price of Peruvian guano. A stimulus has been given to the manufacture of portable manures, and the attention of many intelligent farmers has been directed to experimental investigations as to their value compared with guano. The manures that are manufactured for top-dressing the cereal crops are mainly nitrogenous and phosphatic compounds. When these elements are awanting—as in the case of the Economical Manure, analyzed by Dr. Anderson—the compound is simply worthless. Mr. Townsend, Glasgow, Mr. Weir, Ayr, and other respectable manufacturers, sell by a guaranteed analysis; and we think that farmers would act wisely in giving their corn manures a trial.

A very considerable quantity of superphosphate of lime was used in Ayrshire last season as a top-dressing for wheat and oats, and as far as we can learn the results have been satisfactory. It is right to remember, however, that the high temperature of the summer of 1857 was very much in favour of superphosphate. The experience of a cold, moist season would be less favourable.

Mr. Richmond made some interesting experiments last year, on the farm of Burnton, near Dalrymple, for the purpose of testing the value of superphosphate as a corn manure, when combined with nitrogenous manures in various proportions. The manures were carefully weighed and mixed, and sown each on a single ridge to a certain number of yards from the end. The crop dressed with each manure could thus be easily compared with the crop on the remainder of the same ridge which got no top-dressing whatever. An equal money value was applied to each of the lots. The manures were harrowed in with the seed about the end of February. In making the experiments, Mr. Richmond merely intended to examine the crop carefully during its growth, and to form an opinion from observation. If experiments are to be followed to the barn floor, and brought to the final test of weight and measure, they are not worthy of much reliance unless they have been made on a pretty large scale, and the work, from first to last, has been conducted with care and precision. But to the practised eye of the observant farmer, a small experiment may be valuable if he have the opportunity of seeing the crop during its growth.

Mr. Richmond's experiments seemed to point unmistakably to the propriety of putting a considerable proportion of phosphate into manures for wheat. The crops at Burnton, as at Craigie, refuse to admit to the Rothamsted axiom—"Ammonia for corn, phosphorus for turnips." It is plain enough that in Ayrshire both crops are benefited by both manures.

In the experiments at Burnton, equal weights of sulphate of ammonia and superphosphate gave a better crop than two parts sulphate and one part superphosphate, while both lots were decidedly superior to sulphate alone or superphosphate alone. Peruvian guano alone gave a good crop; but equal weights of guano and superphosphate were about as good, and two parts guano and one part superphosphate were superior to either. Again, equal weights of muriate of ammonia and superphosphate were appreciably superior to two parts of muriate and one part of superphosphate, and both were very much superior to muriate alone or superphosphate alone. The lot dressed with equal weights of muriate aud superphosphate was the best of the whole. Equal weights of sulphate and superphosphate gave the second best, and two parts guano and one part superphosphate the third best crop. When we made our inspection and took notes in August, these lots, at the termination of the top-dressing, stood up like the step of a stair above the wheat that had not been top-dressed. The wheat dressed with superphosphate alone had less straw than any of the lots which were dressed with ammoniacal manure, but it was obviously more growthy than the wheat alongside, which got no top-dressing; and it was firmer of the straw and earlier than any of the lots. The experiments were made on a thin heavy soil, which might have been thought favourable for ammoniacal manures. The turnip crop of the previous year was grown on farm-yard manure and superphosphate of lime.

These experiments show that an equal money value of sulphate or muriate of ammonia and superphosphate of lime, gave a better return last year than Peruvian guano, as top-dressing for wheat. They also indicate that muriate of ammonia was the cheapest source of ammonia to the farmer. But it is perfectly possible that similar experiments may give different results this season, as the summer may not be so favourable as the last for superphosphate. Such experiments should be more frequently made. When observation during the period of growth is afterwards either corrected or strengthened by weighing and measuring in the barn, the experiments of course are more satisfactory; but a very considerable amount of labour is required to do this as it ought to be done. An opportunity, however, of observing the crop during the season of growth may sometimes convey useful lessons to the farmer; and a little attention may enable anyone to make a few simple experiments for this purpose.—Ayr Advertiser.

THE NEGLECT OF AGRICULTURE THE FORERUNNER OF NATIONAL DECAY.

Sir,—We read of the neglect of agriculture being the downfall of the Roman Empire. When Julius Cæsar conquered all the then-known world, he made every country, as he conquered it, pay a tribute in corn instead of gold and silver; which soon ruined the Roman farmers, by having their markets glutted with corn the produce of other countries instead of their own.

It is plain, corn grown in England is doubly advantageous, because it is produced by English labour instead of foreign labour. The *Mark-lane Express* is doing wonders by opening the eyes of the foreign farmers, by showing them weekly the wonderful improvements in our agricultural implements. Of course common sense says that a vast deal of our agricultural machinery will find its way into all parts of the globe to cultivate their land with, which will cause our English markets to be glutted with foreign corn produced by foreign labour. It is expedient to give the British farmer a tenant-right (*alias* equity or justice between landlord and tenant), or the foreigners with our English-made implements in husbandry upon their maiden lands—the foreigners, who pay light rents and taxes, in a few years will bring the English farmers to the same position as that in which the Roman farmers were. No country can be great that is poor in agriculture. Upon estimating the value of the stock and crops in England, it will be found that ours is the richest country, per acre, on the face of the earth.

Samuel Arnsby.

Mill Field, Peterborough, April 8.

STOCKBRIDGE ANNUAL SHEEP AND CATTLE SHOW.

The premiums given this year were nearly double as compared with former years, and, as a natural consequence, the competition was more keen. The stock exhibited, particularly of sheep, was of that usual good quality which distinguishes the flocks and homesteads of Hampshire and Wiltshire. The principal exhibitors were the Right Hon. the Earl of Portsmouth; Mr. Moore, Littlecott; Mr. Bennett, Chilmark; Mr. Edney, Whitchurch; Mr. Olding, Amesbury, and others. Mr. Pain, of Houghton, exhibited a pen of teg rams as extra stock, which was highly commended by the judges; a pen of ram lambs, eleven weeks old, shown by Mr. Moore, of Littlecott, were also much admired.

For the best Hampshire Down Ram, a silver cup, value 3l. 3s. —Mr. Bennett, Chilmark.

For the best Hampshire Down four-tooth Ram, a silver cup, value 3l. 3s.—The Earl of Portsmouth.

For the best Hampshire Down Teg Ram, a silver cup, value 5l. 5s —Mr. French, Longstock.

For the second best ditto, a prize of 1l.—Mr. Edney, Whitchurch.

For the best Ram of any kind, breed, or age, the criterion of merit to be the possession of general qualities necessary to form the most useful and profitable sheep, a prize of 2l.—Mr. John Moore, Littlecott.

For the best Hampshire Down four-tooth Ram, a prize of 2l.—Mr. Olding, Amesbury.

For the best Hampshire Down Teg Ram, a silver cup, value 5l. 5s.—Mr. F. Baily, Candover.

For the second best ditto, a prize of 1l.—Mr. Olding, Amesbury.

For the best Hampshire Down Ewe Tegs, bred by the exhibitor, in the proportion of 2 to every 100 Ewes kept and put to tup in the preceding year, to be kept with the flock up to the day of exhibition, a silver cup, value 3l. 3s.—Mr. Bennett, Chilmark.

For the best Hampshire Down Ewes in milk, in the proportion of 2 to every 100 Ewes kept and put to tup in the preceding year, to be kept with the flock up to the day of exhibition, a silver cup, value 3l. 3s.—Mr. Lywood, Houghton.

For the best Hampshire Down Ram Lambs, in the proportion of 1 Lamb to every 100 Ewes kept and put to tup in the preceding year, bred by the exhibitor, a silver cup, value 3l. 3s.—The Earl of Portsmouth.

Mr. Edney's Ram Lambs in this class highly commended.

For the best Ram of any age, the exhibitor not saving more than 10 ram lambs, a silver cup (given by Thos. Baring, Esq.), value 3l. 3s.—Mr. Chamberlayne, Up-Somborne.

For the second best ditto, a prize (given by T. Baring, Esq.) of 2l.—Mr. Ayles, Michaelmarsh.

For the ten best Hampshire Down Ewe Tegs, bred by the exhibitor, to have been kept with the flock up to the day of exhibition, the exhibitor not saving more than ten ram lambs, a silver cup (given by Mr. John Day), value 5l. 5s.—Mr. Elderfield, Houghton.

For the ten best Hampshire Down Ewes, in milk, to be kept with the flock up to the day of exhibition, the exhibitor not saving more than ten ram lambs, a prize of 2l. 2s.—Mr. French, Longstock.

For the best Cow, in milk, a cream jug (given by Mr. John Day), value 3l. 3s.—Mr. Foster, Kingsomborne.

For the second best ditto, a prize (given by Mr. Day) of 2l.—Mr. W. Pothecary, Wallop.

For the best Heifer, in milk, not exceeding three years old, a prize of 2l.—Mr. Flower, Longstock.

For the best Bull, a prize of 2l.—Mr. C. Fielder, Sparsholt.

For the best fat Calf, under 12 weeks old, bred by the exhibitor, a prize of 1l.—Mr. C. Fielder, Sparsholt.

For the best Boar, a prize of 2l.—The Earl of Portsmouth.

For the second best ditto, a prize of 1l.—The Earl of Portsmouth.

For the best Breeding Sow, a prize of 2l.—The Earl of Portsmouth.

For the second best ditto, a prize of 1l.—The Earl of Portsmouth.

For the best Cart Stallion, prize of 2l.—Mr. Ayles, Michaelmarsh.

For the best Cart Mare, in work, prize of 3l.—The Earl of Uxbridge.

For the second best ditto, a prize of 1l.—Mr. French, Longstock.

For the best Cart Colt or Filly, foaled since the year 1854, bred by exhibitor, a prize (given by Thos. Baring, Esq.) of 2l. 2s.—Mr. T. Attwood, Stockbridge.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A **Weekly Council** was held on Wednesday, the 28th of April: present, Lord Berners, President, in the chair; Marquis of Downshire, Lord Feversham, Hon. A. Leslie Melville, Hon. Colonel A. Nelson Hood, Hon. William George Cavendish, Sir John V. B. Johnstone, Bart., M.P., Mr. Dyke Acland, Mr. Astbury, Mr. Raymond Barker, Mr. Hodgson Barrow, M.P., Dr. John Bright, Mr. J. S. Budd, Mr. Caldwell, Colonel Challoner, Mr. Corbet, Dr. Daubeny, Mr. Davey, M.P., Mr. Druce, Mr. Joseph Druce, Mr. Fison, Mr. Brandreth Gibbs, Dr. Gilbert, Rev. L. Vernon Harcourt, Professor Henfrey, Mr. Fisher Hobbs, Mr. Wren Hoskyns, Mr. Richard Jennings, Mr. Langston, M.P., Mr. Lawrence, Mr. Thomas Lee, Mr. John Lloyd, Mr. Majendie, Mr. Milward, Professor Nesbit, Mr. Pain, Mr. David Pugh, M.P., Mr. Robinson, Mr. Thomas Scott, Mr. Slaney, M.P., Rev. William Smyth, Mr. W. C. Spooner, Mr. Banks Stanhope, M.P., Colonel Towneley, Mr. Vyner, Mr. Burch Western, Mr. Wilshere, and Mr. Joseph Yorke.

Communications were received from Mr. Duckham, on the desirableness of the Society's Country Meeting for 1862 being held at Hereford, and of that county being represented in the Council on the nomination of members resident within it; and from Mr. W. G. Field, of Notting-hill, on the establishment of a permanent depôt, in the neighbourhood of London, for the exhibition of live stock and implements.

Lecture.—Dr. Voelcker, consulting chemist to the Society, then delivered before the members the following lecture, "On Agricultural Chemistry, in its Relation to the Cultivation of Root Crops," Lord Berners, President, in the Chair:

My Lord, and Gentlemen,—If there ever was a time when a knowledge of science was more useful to the agriculturist than at another, it is the present. If there be any country in which a knowledge of science is of more direct use than in another, it is England. There are various circumstances which conspire to account for this. If we look to the agriculture of the Continent or of the Colonies, we shall find that there is little scope left to those farmers who are possessed of theoretical knowledge of those sciences that apply more especially to agriculture. It is different in England. English agriculture, as we all know, is perhaps the first agriculture of the world. Certainly, in no country is agriculture in such an advanced state as in England; and it is easy to demonstrate, if it were necessary, that, in countries in which agriculture has reached a high state of perfection, resources are open to the cultivators of the soil, which in less favourable conditions are totally inapplicable. England certainly has the advantage of having the landed property in large estates, for the most part: it is blessed with intelligent proprietors, and with large tenant-farmers, who, in the present state of agriculture, find it impossible to overlook altogether the resources which are offered to the agriculturist by science. But it is foreign to my object to dwell upon a comparison between English and continental agriculture. I allude to the subject here, in order briefly to remark upon the necessity which I believe exists at the present time of a more extensive cultivation of the study of sciences on the part of the rising generation of agriculturists. In no country is this more desirable than in England. We require better instruction among every class of men interested in agriculture. The landlord may derive great advantage, I am convinced, if he have a knowledge of the rudiments of science, for it will enable him to distinguish at once between the suggestions of the true man of science, and those which emanate from men that are neither practical nor scientific, which are so much calculated to throw discredit upon all scientific investigations, and thus retard the application of science to agriculture. And the large tenant-farmer is brought into more direct contact with scientific matters, since many improvements, which are only practical on large estates, are based on chemical principles. All farmers who manage farms of any extent are compelled to use artificial manures: and here we find that those who have not a clear appreciation of the circumstances which regulate the value of artificial manures, are entirely at the mercy of men who designedly seek to dispose of substances that do not deserve the name of manures. This could not be possible if every tenant-farmer had a knowledge of the first principles of chemical science. At the same time it is quite true that everybody does not stand in the same need of acquiring a knowledge of chemistry. It would be ridiculous, I think, to teach the agricultural labourer agricultural chemistry; nor would it be desirable that the small tenant-farmer should occupy his time in acquiring chemical knowledge. He requires to be eminently a practical man, and to be satisfied with simple tastes, and he will realise little benefit if he employ his time in the study of a knowledge which, in his position of life, will be of comparatively little practical utility, since he finds no scope for the exercise of such superior knowledge. But the question is quite different with the landed proprietor and the tenant-farmer who manages even a moderately-sized farm. There have at all times been excellent practical men who do not pretend, and never have pretended, to any knowledge of chemistry; and though there may be some who speak disparagingly of chemical science even at the present time, yet I believe the most intelligent farmers have a sort of intuitive feeling that they might have spared themselves a great deal of labour in acquiring that practical knowledge which so eminently distinguishes them at the present time, if they had possessed those facilities which are now offered to the rising generation in acquiring a knowledge of science, more especially chemical science. They are, therefore, anxious to secure to their sons and those dependent upon them the means of not only acquiring rapidly the experience which by a long process they have themselves accumulated, but to extend that experience; and I believe there is no better mode of rapidly acquiring practical experience and extending our knowledge of practical matters than a study of the principles on which agriculture is founded, more especially chemical principles. Science is eminently calculated to get experience; for what is science after all, but the systematic arrangement of well-authenticated facts? At an early stage of almost any practical occupation there is no scope for the exercise of scientific applications; the facts are limited, and they can be easily recollected. But when the number of facts accumulates to an extraordinary extent, none but those blessed with an exceedingly good memory can gain practical information. We want, then, some grand principles which shall enable us to recollect facts. Neither chemistry nor any other branch of science ought to be the direct guide to the agriculturist. It should never put itself in the position of telling a practical man what he has to do; but it ought to explain the experience of farmers and facilitate the understanding of practical matters to the rising generation; for there would be no progress whatever possible if each generation had always to learn again the same practical matters, a knowledge of which their forefathers had gained. They require to have some grand principle, to lay hold at once of those numerous practical facts, and then they are in a position to extend previous experience. Hence, I believe, at the present time especially, science is eminently calculated to be of great utility to the rising generation. The most successful farmers in all ages have always been men in advance of their times. Our most excellent farmers of the present time have been distinguished in their manhood for something for which they were ridiculed at one period of their life. When they had to contend against popular prejudices, chemistry as a science was altogether unknown. In all probability if chemical science had been applied to agriculture as it has since been, they would have been "meddling" with it, as the phrase goes; but they "meddled" with some new plough or some new implement for which they were ridiculed, and at first it would seem properly, because they failed in their attempts: but they were men of character, perseverance, and intelligence; they did not abandon a new process because it was ridiculed, they did not cast aside a new instrument because it did not at once work well; they put their shoulders to the work, applied their intelligence, brought out the new implement, or, by making use of their previous experience, introduced a new process, which was gradually accepted, since it was found to answer in a great many instances, and the circumstances under which it would be useful to the farmer were clearly recognised. Chemical science in its relation to agriculture had to pass through all the different stages which a new-born babe or child has to pass through during the first years of existence. We have seen the joy with which the new light of chemistry in its relation to agriculture, as it has been called, has been greeted. Those who have welcomed it with the greatest joy have, it cannot be denied, too much petted, so to say, those scientific men who applied themselves to the investigation of chemical subjects in relation to agriculture: and it has very soon appeared that, like petted children, many of the professors of chemical science over-estimated their own powers, and instead of explaining the experience of practical men, they set themselves up as guides to the farmers; in short, they over-estimated the powers of the new science, and, in consequence, stumbled. It cannot be surprising that practical men should have laughed, at various times, at the extravagant expectations which were held out by scientific men themselves. It was very soon found out that, as yet, chemical science had nothing but promises to offer. It was then that chemistry had to pass through many troubles; it received a rough handling; and it is surprising that amidst the petting on the one hand, and the rough handling on the other, it did not die a natural death. But it is fortunate that, at all times, there are intelligent and liberal-minded men who, though they may regret the extravagances of the young, yet recognise the talent that may be but a spark, but which requires only to be directed in the proper channel to become mighty means for practical and social good. It reflects great credit on that immortal man Mr. Pusey to have foreseen, with all his practical tact and clear intelligence, the important advantages which chemistry is capable of securing at one time or the other, and who was fortunate enough to secure the services of my predecessor in office. The services rendered by Professor Way to this Society, and to agricultural society at large, are too well known to require comment from me on this occasion. His works will be read and appreciated by successive generations; they have a permanent value, and belong to the choicest contributions of your Journal. In alluding to your Journal, my Lord, excuse my making one remark, which may, perhaps, appear out of place. I was surprised the other day to hear that the Journal was in danger of losing its standing as the first leading agricultural publication of the day; that the former volumes were much more practical than those issued in later years. I was surprised to hear these remarks, because I have heard remarks in the opposite direction from many agriculturists with whom I have conversed. There will always be differences of opinion; but it is worthy of remark that the most talented, rising young farmers generally speak very favourably of the contributions to the later volumes of the Royal Agricultural Society's Journal; whilst observations of an opposite tendency are chiefly made by men who were of full age, if I may use the expression, when chemistry, as a science, was altogether unknown. Be this as it may, it is clear that a different mode of thought and expression pervades the productions emanating from the younger agricultural writers, which proves, I think, that the rising intelligent farmer is no longer satisfied with having simple direction in practical matters—is not simply satisfied with being told "You must do this or that," unless he is told at the same time the reason for this recommendation. And I believe that it is equally true that frequently no satisfactory explanation can be given of practical farming matters without using scientific language, however simple it may be. And, lastly, I would observe, with respect to this subject, that many of the most valuable contributions will remain a dead letter to those who have not studied the rudiments of science. In short, a knowledge of the rudiments of science, more especially of chemistry, is necessary to all who would successfully compete with the future rising generation; and if they neglect the opportunities which are now afforded to them in acquiring chemical knowledge, and a general knowledge of the principles of science, they must be content to forego the enjoyments and benefits which are peculiar to a highly-civilised country like England, and must be content to try their hands in clearing an habitable spot in the back-woods of Canada or North America, or to live, or rather vegetate, in one of our colonies. Agricultural chemistry in its application to farming is altogether a new science; and hitherto it has been, like every new knowledge, too vague and too general in its doctrines as well as in its researches. What is required at the present time is experiments made for a special purpose researches carried on in the field as well as in the laboratory. We have need of the joint labours of practical men and men of science. There are multitudes of subjects which can only be properly investigated if the man of science heartily joins with the practical man, working cheerfully together each in his own department. Nearer approach between agriculture and science, in short, is what is required at the present time. A general knowledge of the principles of farming, however useful to the practical farmer, never will help him to grow a large crop of turnips: he must have special training in practical matters in order to be a successful farmer. So it is with chemical knowledge. Men may have excellent general chemical knowledge, but if they have not special chemical knowledge in relation to farming, their labours will be of little direct utility to the agriculturist. We understand in England better than in any other country the division of labour, and this circumstance is highly favourable to the development of agricultural chemistry, for greater opportunities are offered than in any other country to men trained in scientific matters to apply their scientific knowledge to special purposes. I might take up any subject to illustrate the intimate connection of scientific labours with practical matters; but I believe there is none better calculated to show more the direct bearing of chemistry upon agriculture than the cultivation of root crops. In cultivating root crops the farmer is directly thrown in contact with chemistry, for few farmers at the present time can produce sufficient natural manure to satisfy their expectations of growing large crops of roots, and hence they are compelled to employ artificial manures. From the first period when the seed is put in the ground, or the soil itself is cultivated, to the very last moment when the roots are consumed on the farm, the farmer meets with many matters in which a knowledge of chemistry is extremely useful to him. Take, for instance, the mechanical cultivation of the soil. He is at once shown the reason why it is of the utmost importance to work the land properly, to subdivide it, to cultivate it deep. By this mechanical means he liberates mineral food for the use of root crops, which are specially benefited by readily available mineral food; for, like all quick-growing plants, roots require their food to be prepared before-hand. Hence, if on stiff lands you neglect the mechanical preparation of the soil, you have not a sufficient amount of available food to satisfy the immediate wants of the growing root crop. Then again, in putting the seed into the ground, the intelligent agriculturist is reminded of various purely chemical matters; and the question occurs to him, "Can I hasten the germination of my seed by the application of certain salts, or by soaking it in certain dilute acids? or can I use any other chemical preparation to make the seed germinate, and bring up the young plant more rapidly?" But in no time in the cultivation of root crops is a knowledge of chemistry of greater utility than when the farmer has to decide what manuring substances he ought to apply in order to obtain a good crop of mangolds, swedes, or turnips. Perhaps he is told he ought to use super-phosphate, or guano, or a mixture of the two, or a special turnip manure: how is he to decide what super-phosphate he is to select, if he does not understand the character of the ingredients that enter into the composition of super-phosphates or guano? and how can he understand the chemical composition of super-phosphates if he does not understand chemical terms? If he look at an analysis like that before me, he may glance over it; but if he does not understand what the meaning of the term "soluble phosphate," for instance, is, he runs the risk of selecting an inefficient manure, which he buys simply because an analysis has been offered him. It never enters his mind that a man who has to sell a very inferior article would have it analyzed, and to issue the analysis with all the impurities which the manure contains; hence, he is satisfied with simply seeing the analysis. It is, therefore, of great utility to understand the chemical terms for the substances that enter into the composition of those manures which are most frequently used for agricultural purposes. But, in the first place, it is of great importance to be able to select those manures which are best adapted to the cultivation of roots. Let us take, for example, the cultivation of swedes. We hear constant discussions as to whether guano is better than super-phosphate, or whether a mixture of guano and super-phosphate should be used; and these discussions are never brought to a successful issue, simply because we require to ascertain, first, whether ammoniacal matters can be dispensed with in the cultivation of root crops, or not, and what the conditions are under which we can dispense with ammonia, a very expensive manuring constituent. The question of the superiority of guano or super-phosphate mainly hinges upon this: "Can I dispense with the expensive ammonia, and yet grow a good crop of roots?" Now, I have no hesitation in saying that there are many instances in which roots may be grown with great advantage without the direct application of ammoniacal manures; and that in all these instances a great deal of the most useful constituent of guano is, comparatively speaking, lost, and that guano is therefore to a great extent misapplied. Now, before I allude to some experiments which I made some years ago, and which I hope the Society will enable me to carry on for years to come (for it is only by a succession of experiments that truth is gradually established), I would simply mention the practical experience of many farmers who have found that a mixture of super-phosphate and guano has answered much better than guano alone; and likewise the fact that inferior guanos, rich in phosphates, but, comparatively speaking, poor in ammonia, have answered better, practically, than the best Peruvian guano. I might also appeal to the experience of many farmers who apply nothing else in the cultivation of their roots but super-phosphates prepared from bone-ash alone. Moreover, it is the tendency of the present time to produce super-phosphates comparatively poor in nitrogen. It is not likely that an intelligent class of men like the artificial manure makers would shorten the supply of ammonia in artificial manures if they did not find that it answered their purpose. If they could satisfy their customers without going to the expense of using much ammonia in the composition of artificial manure, they were evidently the gainers. I would not, however, have you to understand that I think that ammonia can be dispensed with even in the cultivation of root crops. I know that it cannot be. There are many soils on which the very cheapest manure that you can possibly use is guano. There are many soils in which ammoniacal matters are beneficial to the root crops; but the instances are far more numerous in which phosphates are more beneficial. With a view of throwing some light on the action of ammonia on root crops, more especially on turnips, I some years ago instituted some experiments which were purposely made on extremely poor land—very thin and exhausted land. They were not made with a view of ascertaining how large a crop of turnips I could obtain by the application of certain mixed manures, but more especially for the purpose of ascertaining whether on our soils and the soils in our neighbourhood we could dispense with the use of ammonia or not, and what manuring constituents were likely to be of the greatest benefit to the root crops. I used for this purpose several simple salts—like sulphate of ammonia, sulphate of potash, sulphate of soda, sulphate of lime—besides phosphate in a soluble and most available condition, alone, and mixed with ammonia. That the soil on which the experiment was carried on was extremely poor is shown by the result embodied in the diagram to which I direct your attention. The natural produce of the land in one part was about 3 tons, and in another part 2 tons 11 cwts. 19 lbs. That is the difference between the middle of the field and the outside; it is too small to be taken into account. And allow me to observe that I think that all differences in practical experiments amounting to no more than half a ton ought to be dismissed altogether as accounted for by natural variations in the soil, or by accident. You should not dwell upon these minute differences, and draw nice distinctions as to the action of different manuring matters. And permit me to throw out a hint for all who take an interest in practical experiments, and that is, to test the natural capabilities of the soil by making two experiments with nothing. You will observe that in these experiments sulphate of ammonia had no effect upon the root crop at all; if anything it diminished the produce. I was not a little surprised in obtaining this result, expecting as I did that the ammonia would force on the crop. We are in the habit of connecting the rapid starting of the crop with the presence of ammonia in the soil on the manure: we call ammonia a forcing element, but certainly in relation to the young swede it cannot be so called; it does not force on the seed, but rather retards the germination. In all these experiments I find that the least you do artificially by using various salts or guano, or even super-phosphates, the more rapidly the seed germinates; and hence it follows likewise that it is desirable not to put the seed in direct contact with the artificial manure, and, if possible, to apply farm-yard manure in the autumn; at least, this should be done in heavy land; the manure then has time to diffuse itself throughout the soil, and you do not get those injurious effects which are produced when you put the seed into a part of the soil which is too highly manured, which it necessarily will be if the manure has not had time to diffuse itself throughout it. And even with the application of artificial manures I cannot help thinking that in many instances it would be more useful to apply them with the broad-cast distributor than drilling immediately with the seed. At least I have heard many excellent practical farmers expressing themselves to this effect. I merely throw this out as a matter of report made to me, and not as advocating either the one or the other method of applying artificial manure. Guano more especially retards germination of turnip seeds, and I have no doubt in my own mind that it is the large amount of ammonia in guano that produces this undesirable effect; but I have not found in my experiments that super-phosphates hasten the germination of the seed. When the young plant is up, then readily available food in the soil is of the greatest utility, and the turnip grows rapidly. Hence there is some truth in the observation that super-phosphate pushes on the turnip crop, bringing it out of the reach of the turnip-fly; but it does not facilitate the rapid germination of the seed: it has rather a contrary effect. It has been questioned by high authority whether the effect of super-phosphate on root crops might not be due as much to the sulphuric acid as to the phosphoric acid; but you have here a direct experiment which proves better than any theoretical reasons the erroneousness of this view. With super-phosphate alone, made from purely mineral phosphate, the natural produce of the land, amounting to three tons on the average has been nearly trebled. In all experiments, in short, where phosphate has been used, the crop has very much increased; whereas when gypsum has been applied, no benefit has resulted from the application. I may add that last year I made another series of experiments in which the same result has been brought out:

With nothing the produce was ..	6 tons	11 cwt.	2 qrs.
With gypsum	6	13	3
Whereas super-phosphate without ammonia produced	10	17	0

In all these experiments neither sulphuric acid applied in the shape of gypsum nor ammonia has done any good. In an experiment made on another part of the farm last year, I again found that ammonia was of no utility. Thus sulphate of ammonia applied to a field which naturally yielded 6 tons 11 cwt., produced 5 tons 6 cwt. 21lbs.—to some extent diminishing the produce. It is certain that in these cases ammoniacal manures, like guano or compound turnip manures, are to a great extent misapplied, because the farmer loses the immediate effect of the most expensive constituent of the manure. But I am acquainted with other experiments in which guano is of very great utility, and produces a better effect than purely mineral phosphatic manures. It remains to be seen what the exact circumstances are, under which we can dispense with ammoniacal manures, and also under what circumstances we can dispense with phosphatic manures for the cultivation of root crops: for I think that there are instances in which even superphosphate is misapplied—in which superphosphate and phosphatic manures as applied to root crops are of little practical utility. I should be extremely gratified if any instances of practical failures with superphosphate were reported to me, and portions of soil reserved for further examination, if such should be found necessary. The question whether we can dispense with the artificial supply of phosphates is a very important one—next in importance to the one upon which I have just now dwelt—which awaits its practical solution, and will no doubt find it when we continue to institute experiments with a distinct object in view, without reference to any immediate result made with the view of explaining existing practices: it is only then that we can arrive at legitimate conclusions. Experiments are frequently made very much in the manner in which a student in chemistry begins his researches in the laboratory. He tries certain bottles, and puts one fluid with the other to see the result, and arrives at no practical conclusion, because, in nine cases out of ten, he obtains, by mixing four or five bottles together, a black dirty-looking liquid: so, by jumbling together all sorts of manuring matters, and trying to obtain from them any really useful practical results, you do not obtain any from which legitimate conclusions can be drawn. Thus, for instance, we frequently hear of comparisons between guano and superphosphate; but we are not told what description of guano or of superphosphate is taken. You will see, by the diagram before me, that the composition of superphosphate varies greatly. One, for instance, contains only 5 per cent. of soluble phosphate, and 1 per cent. of insoluble; while in another we have 23 per cent. of soluble, and 5½ per cent. of insoluble. Now, if you make an experiment with super-phosphate and guano, and you find the guano greatly beats the super-phosphate, you are not entitled to say that phosphatic manures are of no utility in your particular case—that a mixture of ammonia and phosphate is much more valuable on your farm than phosphate alone; for if you will look at the composition of guano, you will find that in reality you apply a much larger quantity of phosphate than you apply even in a fair average sample of super-phosphate This diagram, moreover, does not give the amount of phosphoric acid which exists in alkaline salts, and which, in good Peruvian guano, is equal to from 6 to 8 per cent. of soluble phosphate; so that, in reality, guano is super-phosphate plus ammonia. I have no hesitation in saying, that in guano, very frequently, more phosphates are incorporated with the land, than with a great many samples of super-phosphate as they are found in the market: for a super-phosphate is considered of good average quality if it contains from 25 to 30 per cent. of phosphates, of which about one-half is rendered soluble; but in guano there is in reality quite as much, if not more, phosphate present. Then, again, experiments are frequently made on land which is in a very highly cultivated state, which is so full of manure that no amount of additional artificial fertilizers can produce any effect. I have before me an account of some experiments which were published some time ago, in all of which about the same quantity of roots was produced. There is a remark, however, which throws some light upon the experiments :—"The only objection to the field as a trial-field for manure was its high condition. It was feared that the lots might be too much alike, and this anticipation has proved correct. In the experiments as much as 7 cwt. of Peruvian guano and 14 cwt. of super-phosphate were employed, and in all instances about the same quantity of produce was obtained." Then, very naïvely, the experimenter, in remarking upon these results, says, "It is to be regretted that one or two lots were not left without any manure whatever, although we have little doubt that such lots would have yielded next to nothing." Well, if they yielded next to nothing, the land could not be in a highly cultivated state. It is evident, I think, that the land was in a state super-saturated with manure, and experiments made on such land are not calculated to throw much light on the efficacy of manuring constituents. I have alluded specially to the question of the efficacy of phosphates and ammonia, in illustrating the direct utility of a knowledge of chemistry to farmers, and I might also have illustrated the same thing by alluding to the various forms in which manuring substances ought to be applied to the land in order to produce the maximum effect. Thus, for instance, I might have alluded to the question, In what state phosphate ought to be used in agriculture? It is plain that for a quick-growing crop, like the turnip crop, food ought to be present in a readily-soluble condition; but, at the same time, I think we cannot lay down a general rule that, under all circumstances, phosphates, which we apply in the shape of artificial manures, should be always perfectly soluble. I make this remark, not because I think it is a question with which the theoretical man has much to do, but it is a question which can be decided in a purely practical manner. Supposing the farmer finds that his land is of such a porous character that bone-dust when used in a finely-divided state becomes sufficiently available to yield him a good crop of turnips, then he would be wrong to go to the expense of buying super-phosphate. What we can use in a raw, unprepared state must evidently be cheaper than what has undergone the manufacturing process. There are some soils in which the most economical way of using phosphatic manures is simply by bone-dust, to ferment it with the farm-yard manure, and, when the heap is set up in the field, to put the bone-dust between the layers, as it is carted. By this mode of fermentation the phosphates become sufficiently soluble in the soil to answer all the practical purposes for which the manure is used. There is no necessity of using phosphates in any other shape in very light sandy soils. But, under other circumstances, if the farmer, for instance, has to deal with heavy land in which the decomposition of phosphates proceeds very slowly, it is of the utmost importance to use phosphate of lime in a soluble form. What I would advise is the purchase of a super-phosphate, in which the farmer gets just what he cannot readily make himself, *i. e.* soluble phosphate of lime. If he wants insoluble phosphate, let him use it in the shape of bone-dust. Then he may be sure in what form he gets it, and does not run the risk of getting an insoluble phosphate in the shape of coprolite powder, in which condition it is of no utility whatever. But, in most instances, the advantages of applying phosphates in a soluble condition have been clearly established. The very term "super-phosphate" shows the practical use to which chemistry is applied at the present time. There are, indeed, in the common daily experience of the farmer, terms used at the present time which would greatly astonish our ancestors. Chemistry will more and more become the common property of the agricultural community, and the more carefully the principles of this new science are studied by the rising generation, the greater will be the practical advantages that will flow from the possession of such knowledge.

On the motion of Lord FEVERSHAM, seconded by Mr. WREN HOSKYNS, the thanks of the meeting were voted to Dr. Voelcker for the able lecture he had then delivered.

SPECIAL COUNCIL (after the lecture): Lord Berners, President, in the chair.

On the motion of Mr. BRANDRETH GIBBS, seconded by the Hon. A. LESLIE MELVILLE, the Council decided that memorials and other documents received from Oxford in reference to the Country Meeting of next year should be taken into consideration on the 5th of May next, when memorials and other documents would also be taken into consideration from Coventry, Reading, and Warwick.

Adjourned to May 5.

A MONTHLY COUNCIL was held on Wednesday, the 5th of May. Present: Lord Berners, President, in the Chair; Earl of Powis, Lord Camoys, Lord Feversham, Lord Walsingham, Hon. A. Leslie Melville, Hon. Col. A. Nelson Hood, Hon. William George Cavendish, M.P.; Sir John Villiers Shelley, Bart., M.P.; Sir Philip Egerton, Bart., M.P.; Sir Charles Morgan, Bart.; Sir John V. B. Johnstone, Bart., M.P.; Sir Archibald Macdonald, Bart.; Sir Edward Kerrison, Bart., M.P.; Mr. Dyke Acland, Mr. Raymond Barker, Mr. Barnett, Mr. Hodgson Barrow, M.P., Mr. Bramston, M.P., Mr. Barthropp, Mr. Brandreth, Mr. Caldwell, Colonel Challoner, Mr. Druce, Mr. Foley, M.P., Mr. Brandreth Gibbs, Mr. Hamond, Mr. Fisher Hobbs, Mr. Holland, M.P., Mr. Wren Hoskyns, Mr. James Howard, Mr. Hudson (of Castleacre), Mr. Humberston (Mayor of Chester), Mr. Huskinson, Mr. Jonas, Mr. Kinder, Mr. Langston, M.P., Mr. Lawes, Mr. Lawrence, Mr. Miles, M.P., Mr. Milward, Mr. Pain, Mr. Shuttleworth, Mr. Slaney, M.P., Mr. Thompson, Mr. Torr, Mr. Turner (of Boston), Professor Voelcker, Mr. Burch Western, and Mr. Jonas Webb.

His Grace the Duke of Marlborough, of Blenheim Park, Oxfordshire, was elected a Governor of the Society.

The following new Members were elected :—

Bradburne, John Hanbury, Pipe-place, Lichfield, Staffs.
Brogden, John, Priory-gate, Sale, Cheshire.
Cawton, William, Somersall Hall, Chesterfield, Derbyshire.
Clay, Charles, Walton Grange, Wakefield, Yorkshire.
Corbet, Dryden, Sundorne Castle, Shrewsbury
Crane, Edward, Foston, Montford, Shrewsbury.
Forshaw, Thomas, Latus Hall, Goosnargh, Lancashire.
Garne, Robert, Northleach, Gloucestershire
Gaskell, Henry Lomax, Kiddington Hall, Woodstock.
Hill, L. Broadbent, Back Hall, Chester.
Holland, Charles, Keele, Newcastle, Staffordshire.
Howard, Robert, Broughton Hall, Wrexham.
Howell, John, Ewen, Cirencester.
Laing, Samuel, Hordle Manor, Lymington, Hampshire
Logan, John, Maindree House, Newport, Monmouthshire.
Matthews, Henry, Montford, Shrewsbury.
Mein, William, Home Farm, Blenheim, Oxfordshire
Millard, James, Rugeley, Staffordshire.
Perry, Samuel, Shipley, Bridgenorth, Shropshire.
Sisson, Robert James, Talardy, St. Asaph.
Sugden, David, Huddersfield, Yorkshire.
Thomas, James, Lidlington, Ampthill, Bedfordshire
Woods, James, Stowmarket, Suffolk.
Woods, Edmund Freeman, Stowmarket, Suffolk.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the monthly report on the accounts of the Society, showing a current cash-balance of £1,298 in the hands of the bankers; and laid upon the table, for the information of members, the usual quarterly statements of income and expenditure, and of assets and liabilities.

TRIAL OF IMPLEMENTS.—The President having called the attention of the Council to the completion this year of the triennial arrangements for the trial of Implements at the Country Meetings of the Society, and to a consideration of the propriety of its renewal or discontinuance for the future, it was carried, on the motion of Mr. Fisher Hobbs, seconded by Colonel Challoner, that a committee, consisting of the Members of the Implement Committee, and of Mr. Howard, Mr. Shuttleworth, Mr. Caldwell, Mr. Huskisson, and Mr. Amos, be appointed, with power to confer with a deputation from the body of the Implement Makers, and to report to the Council at their next monthly meeting in June.

EASTERN COUNTIES' RAILWAY.—On the motion of Mr. Fisher Hobbs, the President undertook to address a letter to the Chairman of the Eastern Counties Railway Company, on the subject of the charges, made only by that company, for *live stock* sent for exhibition at the Country Meetings of the Society.

COUNTRY MEETING DINNER.—On the motion of Mr. Torr, seconded by Mr. Thompson, the Council decided unanimously: "That in future, if any dinner be held at the Country Meetings under the patronage of the Society, the entire management shall be vested in the local committee: but the Council shall have the option and power of reserving and taking such a number of tickets as it shall think fit; and this Society shall nominate the Chairman, and supply the list of toasts, but shall have no other liability connected with it."

COUNTRY MEETING OF 1859.—The report of the Inspection Committee having been read, and deputations received from Coventry, Reading, Warwick, and Oxford, the Council decided that the country meeting should be held at Warwick, next year, on condition that the Mayor of that city entered into the usual agreement with the Secretary of the Society by the next Monthly Council on the second of June. These depuations consisted of sixty-four members, among whom we remarked the following:—

His Grace the Duke of Marlborough.
The Lord Bishop of Oxford.
The Rev. James Clutterbuck, M.A.
The High Sheriffs of the counties of Berks., Oxford, and Warwick.
Right Hon. Edward Ellice, M.P.
Right Hon. Edward Cardwell, M.P.
The Sheriff of Oxford.
The Mayors and Town-Clerks of Coventry, Oxford, Reading, and Warwick.
Sir Joseph Paxton, M.P.
Earl of Macclesfield.
Viscount Dillon.
Mr. Palmer, M.P.
Mr. Greaves, M.P.
Earl of Warwick.
Lord Willoughby de Broke.
Lord Guernsey.
Lord Leigh.
Mr. Harcourt, M.P.
Colonel North, M.P.
Mr. Repton, M.P.
Mr. Mark Phillips.
Sir T. G. Skipwith, Bart.
Sir Paul Hunter, Bart.
Mr. Pigott, M.P.
Aldermen Moore, Spiers, and Ward.
President, Vice-President, and Secretary of the Oxford Farmers' Club, and Deputations from the Rugby, and Dunchurch Association, and the Council of the Birmingham Cattle Show.

COUNTRY-MEETING QUERIES.—On the motion of Mr. Raymond Barker, seconded by Mr. Brandreth Gibbs, a committee was appointed to revise the printed queries (in use since the year 1841), and adapt them to the present requirements of the Society, consisting of Mr. Raymond Barker, Mr. Brandreth Gibbs, Hon. W. G. Cavendish, M.P., Mr. Brandreth, Mr. Barnett, Mr. Fisher Hobbs, and Mr. Milward.

EDITORSHIP OF JOURNAL.—Mr. Jonas having moved the consideration of the best course to pursue for the future Editorship of the Journal, Mr. Thompson, Mr. Dyke Acland, and Mr. Wren Hoskyns favoured the Council by an expression of their willingness to continue their Joint-Editorship provisionally until some other arrangement should be made. On the motion of Mr. Raymond Barker, seconded by Sir John Shelley, Bart., M.P., it was carried, that the Joint-Editors be authorized to expend a sum not exceeding £300 per annum, for such aid as they might require.

LECTURES.—Mr. Thompson reported from the Journal Committee their recommendation that Professor Henfrey should be requested to deliver a Lecture before the members at the Weekly Council on Wednesday, the 26th of May, at half-past 12 o'clock, on some subject connected with Vegetable Physiology. The Mayor of Chester's communication of an offer from Mr. Moffat to deliver a lecture at the Chester Meeting, on Atmospheric Influence in connection with the Potato Disease, was referred to the Journal Committee.

DISTRIBUTION OF JOURNAL.—On the motion of Mr. Milward, seconded by Mr. Jonas Webb, the Council decided that the rule by which no governor or member in arrear of subscription had a claim to receive the Journal should be strictly enforced.

SPURIOUS GUANO.—Sir John V. B. Johnstone, Bart., M.P., read the following report from the Chemical Committee:—

> Professor Voelcker has submitted analyses of Cotton-cake, containing a larger proportion of oil and flesh-forming matter than Linseed-cake; and also various specimens of factitious guanos perfectly resembling genuine Peruvian guano in colour and smell, containing only from one-fourth to one-third of genuine Peruvian guano. He has also exhibited to the Committee specimens of guano from Kooria Mooria and the Falkland Islands, as well as from Ichaboe; all inferior to the extent of from one-fourth to one-half of the best Peruvian guano. At the suggestion of the Committee Prof. Voelcker has undertaken to prepare a short report on these specimens, to be submitted to the members of the Society at the next Weekly Council.

CHESTER MEETING.—Mr. Fisher Hobbs reported from the Chester Committee the favourable progress of the arrangements for the ensuing Country Meeting, to be held in that city in the third week of July next.

Steam-Cultivators.—Sir Archibald Macdonald, Bart., as Senior Steward of Implements for the Chester Meeting, having represented the importance of an efficient trial of Steam-Cultivators at the Chester Meeting, the following resolution on the motion of Mr. Thompson, seconded by Mr. Miles, M.P., was carried unanimously:—"That a committee be appointed consisting of the Implement Committee, with the addition of Mr. Caldwell and Mr. Huskinson, to consider the memorial presented by four owners of steam ploughs, and to endeavour to secure an efficient trial of steam ploughs or cultivating implements at the Chester Meeting."

Steward of Poultry.—On the motion of Sir rchibald Macdonald, Bart., seconded by Mr. Fisher Hobbs, Mr. Harcourt Powell, of Drinkstone Park, Suffolk, was unanimously appointed Steward of Poultry for the Chester Meeting.

Vice-President.—On the motion of Mr. Jonas, seconded by Mr. Torr, his Grace the Duke of Rutland was unanimously elected one of the Vice-Presidents of the Society, in the place of the late Lord Braybrooke.

Member of Council.—On the motion of Mr. Torr, seconded by the Hon. A. Leslie Melville, Mr. Hutton, of Gate Burton, Lincolnshire, was elected one of the General Members of Council, in the place of the late Mr. Stephen Mills.

Gutta Percha.—A communication from the Society of Arts on the supply of Gutta Percha, and its employment in the manufacture of agricultural tubing, was referred to the Implement Committee.

Thrashing Machines.—Suggestions for the trial of thrashing machines were received from Mr. Algernon Clarke, and also referred to the Implement Committee. Adjourned to May 12.

A **Weekly Council** was held on Wednesday, the 12th of May, present: Lord Berners, President, in the Chair, Duke of Rutland, Lord Camoys, Lord Walsingham, Hon. A. Leslie Melville, Hon. Colonel Hood, Hon. William George Cavendish, M.P., Mr. Raymond Barker, Mr. Brandreth, Mr. Davey, M.P., Mr. Brandreth Gibbs, Mr. Glegg, Mr. James Howard, Mr. Fisher Hobbs, Mr. Hutton, Mr. Pinder Simpson, Mr. Slaney, M.P., Mr. Tanner, Colonel Towneley, Mr. Wilson (of Stowlangtoft), and Mr. George Wood.

Professor Voelcker, the Consulting-Chemist of the Society, transmitted the following reports of his recent investigations on the subject of cotton-seed cake for feeding cattle, and on the fabrication of spurious guanos, so completely similar in external characters to the genuine articles as to have deceived the most experienced dealers, and to have their inferior value detected only by means of chemical analysis.

I.—COTTON-SEED CAKE.

I have the pleasure of submitting to the inspection of the members of the Society copies of analyses of two samples of a new kind of Cotton-seed cake. Both samples, under the name of decorticated Cotton cakes, were lately offered for sale at London and Liverpool respectively. An inspection of the subjoined analyses will show that this new kind of cake is superior in nutritive properties to any sample of Cotton-cake which I previously examined. It will be observed that both are extremely rich in flesh-forming principles, as well as in oil and fatty matters. Indeed both specimens of Cotton-cake contained a great deal more of these valuable constituents than the best Linseed-cake, and ought to be, according to the analyses, more valuable as a feeding stuff than Linseed-cake. I would observe, however, that the analytical results obtained in the examination of feeding stuffs like oilcake are insufficient in themselves to determine their relative practical feeding value. Various circumstances, too numerous to be detailed in this place, affect the practical value of articles of food. Thus the oil in Cotton-cake may not be so readily assimilated as the fatty matters in Linseed-cake, or it may not agree with the constitution of animals, or the cake may be disliked by beasts and sheep, or contain something or the other, not usually ascertained by analysis, which may affect its practical utility. Indeed nothing short of actual feeding experiments will suffice to ascertain in a satisfactory manner the comparative value of this Cotton-cake and Linseed-cake. But as Cotton-cake, much inferior in composition to the samples analyzed by me lately, has been used for feeding purposes with considerable advantage, it is highly probable that the experience of practical feeders will prove that decorticated Cotton-cake is an economical substitute for the much more expensive Linseed-cake.

Composition of two samples of decorticated Cotton-seed cake.

	No. I.	No. II.
Moisture	8.27	7.[illegible]
Oil and fatters matters	19.19	14.9[illegible]
Mucilage, gum, and sugar	12.25	14.[illegible]
* Protein compounds (flesh-forming principles)	42.62	40.[illegible]
Pure cellular fibre (woody fibre)	10.22	11.4[illegible]
Inorganic matters (ash)	7.45	8.[illegible]
	100.00	100.[illegible]
* Containing nitrogen	6.82	6.5[illegible]

II.—SPURIOUS GUANO.

Notwithstanding the facility of detecting admixtures in genuine Peruvian Guano by simple chemical means fraudulent adulterations of this most important of artificial manures appear to continue unabated in some quarters. During the last two months, more than [illegible] samples of factitious and of adulterated guanos were sent to me for examination, which circumstance induces me to direct again the attention of the members of the Society to the subject of adulteration of guano. I have the pleasure of presenting for inspection several samples of [illegible] guanos, and have selected specimens which best illustrate the peculiar character of the adulterating materials. An analysis of each specimen is attached to the bottle containing it. A comparison of the composition of these adulterated manures with that of genuine Peruvian Guano of which a specimen is also exhibited, will show how much money a purchaser loses in buying such bad guanos even if sold 2*l.* or 4*l.* less than Peruvian guano can be obtained from Messrs. Gibbs and Co. At the same time will be evident to any one who examines by the unaided senses the various specimens on the table, how [illegible] impossible it is for any one to distinguish several of [illegible] adulterated guanos from the genuine Peruvian. The fact is, the guano-mixers have acquired such skill in their farious practices, that neither by the touch, smell, nor the eye, the adulterating materials can be detected. It is now a common practice to sift off the harder lumps in Peruvian guano, to mix the fine dust most intimately with extremely finely powdered chalk, gypsum, yellow loam, sand, or whatever the adulterating material may be, and to add afterwards the lumps of genuine guano, so as to give adulterated guano the outward characters of the best Peruvian. The expense to which fraudulent dealers go, in preparing in a sufficiently fine state the admixtures in order to obtain a perfectly uniform powder with the fine guano-dust, is very great; but if it be considered that often guano worth only 4*l.* per ton is sold at the full price of the best Peruvian, it will easily be conceived that a good margin for profit is left, notwithstanding the expense. The specimen marked No. I. is a guano which does not contain, I believe, a particle of Peruvian guano, and is altogether a clumsy imitation. It is surprising that such stuff can find purchasers. This so-called guano consists entirely of fine yellow loam, sand, gypsum, chalk, a little salt, and organic matters poor in nitrogen, since this so-called guano furnishes, on decomposition, little more than 1½ per cent. of ammonia. At the utmost, this manure is worth only 3*l.* 3*s.* per ton.

No. I.—Composition of a sample of guano warranted Peruvian, but altogether artificially made up, value only £3 3s. per ton.

Moisture	7.06
* Organic matter and ammoniacal salts	14.56
Phosphates of lime and magnesia (bone earth) ..	17.55
Oxides of iron and alumina	3.82
Sulphate of lime (gypsum)	18.49
Carbonate of lime (chalk)	10.11
Alkaline salts (common salt chiefly)	6.68
Insoluble silicious matter (sand)	21.78
	100.00

Aug. Voelcker.

*Containing nitrogen	1.50
Equal to ammonia	1.82

No. II. is a guano, which has all the appearance of an excellent sample of Peruvian, but which contains in reality only about one-fourth its weight of genuine Peruvian guano, and no less than three-fourths its weight of yellow loam and chalk. Instead of 16 per cent. of ammonia, this guano contains not quite 7 per cent. of ammonia, and scarcely is worth £4 4s. per ton :—

No. II. Composition of adulterated guano sold at Liverpool at £12 per ton.

Moisture	5.85
*Organic matter and ammoniacal salts	16.20
Phosphates of lime and magnesia	8.48
Oxides of iron and alumina	5.90
Carbonate of lime	15.89
Magnesia	.76
Alkaline salts (common salt chiefly)	3.10
Insoluble silicious matter (sand)	44.82
	100.000

Aug. Voelcker.

* Containing nitrogen	3.14
Equal to ammonia	3.82

This guano contains only one-fourth of its weight of Peruvian guano and three-fourths of yellow loam and chalk. The specimens marked No. III. and IV. are not quite so bad as the preceding ones, but still they are bad enough, and contain only about one-third of Peruvian guano, and two-thirds of foreign admixtures. In No. III. the chief adulterating materials are chalk and sand; in No. IV. there is less chalk and much gypsum, as well as yellow loam and fine coprolite powder. Both guanos are worth about £5 per ton. The following table exhibits the composition of these two adulterated guanos, in contrast with that of genuine Peruvian guano :—

Composition of a genuine and adulterated Peruvian guano.

	Genuine Peruvian.	Adulterated Guano.	
		No. III.	No. IV.
Moisture	15.90	9.38	12.86
*Organic matter and salts of ammonia	53.73	24.21	19.33
Phosphates of lime and magnesia (bone-earth)	22.07	16.06	22.12
Carbonate of lime (chalk) ..	None	30.30	5.12
Sulphate of lime (gypsum)..	None	3.91	15.57
Carbonate of magnesia ..	None	—	2.63
Alkaline salts	7.17	3.45	3.75
Insoluble silicious matter (sand)	1.13	12.69	18.62
	100.00	100.00	100.00
*Containing nitrogen	15.74	5 65	5.09
Equal to ammonia	19.11	6.86	6.18

Aug. Voelcker.

I have also the pleasure of placing on the table specimens of guano from the Falkland Islands, Kooria Mooria, inferior Ichaboe, and African guano. By far the most valuable of these is the Falkland Island guano, which, however, is not near so valuable as the best Peruvian guano, since it contains much less ammonia. The Kooria Mooria guano is rich in phosphates, but, like the sample of inferior Ichaboe guano and the African guano submitted to inspection, poor in ammonia. In comparison with the price of the best Peruvian guano, inferior guanos from other places are generally sold also high. In conclusion I beg to observe that in buying Peruvian guano a farmer requires no other guarantee than a letter in which the dealer engages to supply "Peruvian guano, best quality." No expensive analysis is required to test the honesty of the dealer, since a perfectly trustworthy opinion can be given whether the guano is genuine or adulterated, and the ground of an examination, which the members of this Society have the privilege of obtaining at the trifling sum of 5s.

Mr. Fisher Hobbs expressed the great satisfaction it gave to himself, as it would doubtless also give to the other members of the Society, to find their Consulting Chemist thus furnishing to the Council, for immediate announcement to the agricultural community, the practical result of his researches. He was glad to find that at the small expense of 5s. each member had the privilege of obtaining a certificate of the true value of any substance offered to him for purchase as genuine guano. At Mr. Hobbs's suggestion the thanks of the Council were ordered to be transmitted to Prof. Voelcker for the communications he had then made to them, along with a hope on their part that he would continue, from time to time, as they occurred, to furnish such results of investigations carried on in his laboratory as he might think of immediate practical importance.

ANNUAL VETERINARY REPORT.

The following Annual Report was read from the Governors of the Royal Veterinary College:—

In presenting their annual report to the Council, the Governors desire in the first place to express their gratification that during the past year nothing has occurred to disturb the harmony which has so long and so advantageously existed between the Royal Agricultural Society and the Royal Veterinary College. They see in this continued co-operation an assurance that the agricultural community fully appreciates the efforts which are made to advance the science of veterinary medicine in its application to the diseases of cattle, sheep, and pigs, and thus to raise this important branch of the healing art above the practice of the uneducated empyric. During the past year the Governors have had under consideration several important questions relating to the instruction of the pupils, and they early took means to render this as practical as scholastic discipline would permit, by the appointment of a new demonstrator of anatomy, so as to relieve the professors from having to occupy so much of their time in mere expositions of the arrangement of the structural parts of the animal body. The carrying out of this plan has been attended with the happiest result, as the professors have been enabled to extend their lectures and demonstrations on the nature and causes of the various diseases affecting domesticated animals. With reference to the lectures specially devoted to the subject most important to the interests of the general agriculturist, nothing has occurred to prevent their regular delivery four times a-week throughout the entire session, and they have been attended by the whole of the pupils of the College; and with what success, is shown by the fact that the proportionate number which have passed their examination, and been admitted members of the Royal College of Veterinary Surgeons, has been greater than in former years.

Pathological Anatomy.—Throughout the past year there has been received from the members of the Society very many valuable specimens of disease, accompanied by the history of the cases in which they occurred, and these have been made available for the information of the pupils by the demonstrations and explanations of the Professor of Cattle Pathology in addition to his other instructions. The Governors desire to give encouragement to this means of making the education of the pupil as practical as possible, because, from circumstances which would appear to be irremediable, few cattle are admitted as patients at the college. It is a matter of regret to the Governors that no measure which has been tried by them in conjunction with the Society has availed to bring to the College Infirmary a sufficient number of oxen, sheep, or pigs, when the subjects of disease. Even the merely nominal scale of charges which was adopted a few years since for medical attendance, operations, keep, &c., of such animals, has failed in effecting this most desirable object; and the Governors are at a loss to know what more can be done to remove the apathy which exists in the agricultural body with reference to this important means of imparting practical information to the pupils. By thus again directing the attention of the Council to the subject, the Governors would hope that some good may be done.

Pupils.—The number of pupils which have been admitted to the College is somewhat greater than before, and, as previously stated, they have been most regular in their attendance, and will, after receiving instructions for two sessional years, be eligible for examination by the Court of Examiners, under the provisions of the charter granted to the Royal College of Veterinary Surgeons. It may perhaps be necessary to direct the attention of agriculturists to the fact that very many persons who call themselves veterinary surgeons and are practising in various parts of the country have not received the diploma of the College, nor, indeed, have attended any lectures on veterinary science; while others have entered as pupils, remain only a short time, and then gone into the country to practise with but an imperfect knowledge of the principles of the healing art.

Practice of the College.—Although but few cattle have been admitted as patients, yet some very interesting and unusual cases have found their way into the infirmary; and notwithstanding it has not been customary to particularise these, in consequence of thereby unnecessarily increasing the length of the Annual Report, still the Governors are desirous of adverting to one of almost unique character, namely, an affection of the base of the brain in a heifer belonging to Stewart Marjoribanks, Esq. The symptoms in this case were very remarkable, and afforded matter for deep reflection on the part of the physiologist as well as the pathologist. The attack was somewhat sudden, so much so as to lead to the belief that the animal had sustained an injury of the skull, but this was entirely disproved by the *post mortem* examination. The change in the structure of the brain was found to depend upon a scrofulous diathesis, and it raised the question as to how much of the disease was due to hereditary influence. It is matter of importance to the breeders of cattle that scrofula has of late years been considerably on the increase among what may be otherwise designated the better breeds of animals.

Inspections.—The visits into the country by the Veterinary Inspector, on the authority of the Council, have not been very numerous this year, and the Governors would be glad to see that the arrangement which has been made with regard to the inspection of diseased cattle on the premises of agriculturists was likewise in more general use; for they believe much good would result therefrom, not only in arresting the progress of disease, but in investigating the causes, with a view to their removal, on which it was found to depend. At the country meeting of the Society at Salisbury the Inspector was in attendance, and the Governors were much gratified to find by his report that fewer cases of hereditary defects and diseases were existing among the animals there brought together than at any former meeting of the Society. By far the most important investigation of the year which has been made by the inspector is that of the nature and character of the continental disease of cattle, known by the name of the steppe murrain, rinderpest, &c., and which excited so deep an interest in the minds of the whole community for fear of its introduction into this country. It has not only been shown by him that the rumours of its having extended from the steppes of Southern Russia, which may be regarded as the home of the pest, to those countries whence foreign cattle are exported for the supply of our meat markets, were groundless, but that there is scarcely a probability of its reaching this country. Besides this important result of this mission to the continent, the public are likewise now made familiar with the natural laws which govern the spread of the malady, as well as with those preventive measures which continental governments have found most effectual in meeting its progress. Nor would the Governors omit to state as a matter of congratulation to the Society, that the investigations which were made by the Inspector, in daily watching the affected animals, noting the symptoms, and subsequently instituting a searching examination of the lesions found upon death, have enabled him to arrive at a far more satisfactory conclusion of the true pathology of the pest than had hitherto been obtained, and even by those who had for years been practically acquainted with it. The Governors were much gratified to find that not only did the Royal Agricultural Society unanimously agree in the selection of their officer for this important duty, but that the other two National Agricultural Societies of Scotland and Ireland concurred in the choice which had been made; and they are also very desirous of stating that the report which the Inspector has published on the subject has excited a lively interest throughout the continent, and is regarded as a valuable addition to veterinary literature by the new light it has thrown upon the nature of this mysterious and destructive cattle pest.

In presenting however their Annual Report, the Governors are wishful not to extend its dimensions by reference to their several endeavours to do justice to the object sought to be obtained by the union of the two institutions, because they believe that these are equally as familiar to the Council as to themselves, and they would therefore merely conclude by assuring the Council of their full determination to use all the means at their disposal to elevate veterinary science in its application to the diseases of all domesticated animals.

(Signed) on behalf of the Governors of the College.

RICHARD BEAUVOIR BERENS, V.P.

A SPECIAL COUNCIL was held on the same day, present: Lord Berners, President, in the Chair, Duke of Rutland, Lord Camoys, Lord Walsingham, Hon. A. Leslie Melville, Hon. Colonel Hood, Hon. W. G. Cavendish, M.P., Mr. Raymond Barker, Mr. Brandreth, Mr. Brandreth Gibbs, Mr. James Howard, Mr. Fisher Hobbs, Mr. Hutton, Mr. Slaney, M.P., Colonel Towneley, Mr. Wilson (of Stowlangtoft), and Mr. George Wood.

STEAM CULTIVATORS.—Mr. Thompson, Chairman of the Special Committee appointed "to consider the memorial presented by four owners of steam-ploughs, and to endeavour to secure an efficient trial of steam-ploughs or cultivating implements at the Chester Meeting," transmitted the following Report, which on the motion of Mr. Brandreth Gibbs, seconded by Lord Walsingham, was received and unanimously adopted by the Council:—

1. That the prize of £500 offered for the best Steam Cultivator can neither be withdrawn nor divided for the present year.
2. That so long as this prize is offered by the Society, all trials of steam-cultivators must take place in competition for it.
3. That in specification No. 1 in the prize sheet the judges be instructed to interpret "Steam-cultivator" to mean, plough or other cultivating implement worked by steam, provided that all the other conditions specified be complied with.
4. That steam-cultivators shall be in the yard not later than Monday the 12th of July, and the trials commence on Tuesday the 13th.
5. The stewards of the Implement Department shall be at liberty, if they think fit, to have the performance of each implement in this class written out and appended to it in the show-yard.

Adjourned to May 19.

A WEEKLY COUNCIL was held on Wednesday, the 19th of May. Present: Lord Berners, President, in the Chair; Mr. Raymond Barker, Mr. Pickin, Mr. Burch Western, and Mr. Wilson of Stowlangtoft.

Communications were received: 1. From the Rev. W. W. Harvey, of Buckland Rectory, Herts., on three cases of severe personal injuries which had occurred recently in his own neighbourhood in the cases of persons connected with unguarded agricultural machinery. 2. From the Henderson Fund, soliciting aid on the part of the Society. 3. From Sir Philip Egerton, Bart., M.P., a Parliamentary Report on the operation of Boydell's Traction Engine. 4. From Mr. Smith, of Woolston, proposing a trial with his steam-cultivator, as shown at Chelmsford, "to farm cold clay land, hilly and uneven, for four years, against any combination of steam-ploughs that may be shown at Chester, no manure whatever being employed, the horse-power not to exceed the ordinary seven-horse engine manufactured by Ransomes and Sims, and the result to be decided by the total produce, cost, and condition of the land at the end of that period of trial." 5. From Mr. Douglas, an essay on the potato disease. 6. From the British Minister in Switzerland, a copy of Dr. Rupener's new work on the application of veterinary principles to the management of domesticated animals.

DISEASE AMONG SHEEP.—The President reported information he had that day received from Leicestershire on the outbreak of a disease on the udders of ewes, which rendered them hot and sore. The disease was confined at present to particular flocks, and had not yet been taken by barren ewes or lamb-hogs. At the President's suggestion, it was desired that animals infected by this disease should be sent direct to the Royal Veterinary College.

AUDIT.—The half-yearly audit of accounts was held on Friday, the 21st of May. Present, Mr. Raymond Barker, chairman, and Colonel Challoner and Mr. Wilson, members of the Finance Committee; and Mr. George Raymond Barker, Mr. Astbury, and Mr. Joseph Druce, auditors on the part of the Society. The accounts from the 1st of July to the 31st of December being examined, audited, and found correct, were certified accordingly.

SPECIAL COUNCIL.—A Special Council was held on the same day, for the purpose of taking into consideration the Report to be made by the Council to the ensuing General Meeting: present, Colonel Challoner, Trustee, in the Chair; Earl of Powis, Mr. Raymond Barker, Mr. Druce, Mr. Shuttleworth, and Mr. Wilson, of Stowlangtoft. The Report was agreed to accordingly.

GENERAL MEETING. — The Anniversary General Meeting of the Society was held on Saturday, the 22nd of May, agreeably with the terms of the Charter: present, Lord Berners (President), in the chair, Lord Feversham, Mr. Raymond Barker, Mr. Milward, Colonel Challoner, Mr. Hercy, Mr. Joseph Druce, Mr. Scarson, Hon. W. G. Cavendish, M.P., Mr. Burch Western, Hon. Colonel Hood, Mr. Pickin, Mr. Jonas Webb, Mr. Corbet, Mr. Shuttleworth, Mr. Davey, M.P., Sir Wm.

Pell, Bart., Mr. Payne, Hon. A. Leslie Melville, and Mr. Lawrence. The usual preliminaries having been gone through,

The Secretary (Mr. Hudson) read the Report of the Council, which was as follows:—

REPORT.

The Society consists at the present time of—

81 Life Governors,
133 Annual Governors,
904 Life Members,
4010 Annual Members, and
18 Honorary Members,

Making a total of 5146 names on the list.

The Council have elected Mr. Thompson, of Kirby Hall, a Trustee of the Society, in the place of the late Earl Spencer; and His Grace the Duke of Rutland a Vice-President, in that of the late Lord Braybrooke. They have also elected the Hon. Colonel Hood, Mr. Humberston (Mayor of Chester), Mr. Huskinson, and Mr. Hutton, General Members of the Council, to supply the vacancies created respectively by the transfer of Viscount Eversley to the class of Vice-Presidents, and Mr. Thompson to the class of Trustees, and by the decease of Mr. Simpson and Mr. Stephen Mills.

The funded capital of the Society stands at £9,264 8s. 11d. stock in the New Three per Cents.

The Chairman and Vice-Chairmen of the Journal Committee have announced to the Council that their respective personal engagements will not allow them to devote as large a share of attention as they have hitherto done to the editing of the Journal; but they have subsequently acceded to the request of the Council that they should continue their services until some permanent arrangement shall have been made. The Council, in order to diminish the amount of the mechanical details connected with their labours, have placed at their disposal a grant not to exceed £300 annually, for the purpose of engaging such literary aid as they may find requisite for the more convenient editorship of the Journal.

The excellent paper on horse-shoeing, by Mr. Miles, of Dixfield, near Exeter, published in the last part of the Journal, has been reprinted in a cheap form for extensive distribution, and already upwards of a thousand copies have been sold.

The Governors of the Royal Veterinary College have presented their annual report of the progress made at that institution in the application of the veterinary art, and the diseases of cattle, sheep, and pigs. They state that the number of pupils qualified to act as practitioners in carrying out the objects of the Society in this point of view, continues to increase; but they regret that the members of the Society do not avail themselves more extensively of their privilege of sending diseased animals in a live or dead state to the college, and thus furnish means for a larger amount of practical experience to the Professor of Cattle Pathology and his pupils.

The Council have appointed Professor Voelcker, of the Royal Agricultural College at Cirencester, as the consulting-chemist to the Society; and he has already delivered before the members his inaugural lecture on Agricultural Chemistry in its Relation to the Cultivation of Root-crops. They have also made arrangements with Professor Henfrey, of King's College, for the delivery of a lecture on Vegetable Physiology, on Wednesday next, the 26th of May. This lecture, as in the case of Professor Voelcker's, will be taken down in its full extent by a short-hand writer, and immediately made public. The Council hope that this early publication of the lectures, by at once placing before the agricultural community any facts of an important practical character, will be found to meet the wishes of the members.

The Chester Meeting promises, from its variety and extent, to be of an interesting character. The Council have made special arrangements for the trial of steam-cultivators, by which their relative merits will be tested during the whole of the week previous to that of the meeting; and they have decided that machinery in motion shall be exhibited on the same plan as last year. The Council have adopted the recommendation of the Local Committee, that a dinner should take place in the Music Hall at Chester, capable of accommodating 500 guests. They have decided that, for the future, when a dinner is proposed at the Country Meeting of the Society, the whole arrangements shall be made and expenses borne by the Local Committee, the Council reserving to themselves the right of appointing the Chairman, and of preparing the list of toasts; and that, after the present year, the show of poultry as a portion of the Society's exhibition shall be discontinued.

The Council have appointed a committee to report upon the propriety of renewing or discontinuing, after the current year, the triennial arrangement for the trial of implements, adopted for the Chelmsford, Salisbury, and Chester meetings.

The Council have selected Warwick as the place of the Country Meeting for the year 1859; and have decided that after the year 1860 they will be prepared to hold a Metropolitan Meeting, should circumstances be found favourable in the meantime for the adoption of such an arrangement.

By order of the Council,
James Hudson,
Secretary.

On the motion of Mr. Davey, M.P., seconded by Mr. Druce, the Report was unanimously adopted.

Mr. R. Barker rose to nominate the President for the year ensuing the meeting at Chester. He had, he said, the honour to propose for the office of President, at the termination of the current year, his Grace the Duke of Marlborough—a nobleman who had only very recently become a member of the Society, but who had already manifested great interest in its proceedings. His Grace had only presented himself once in that room; and he then appeared as the leader of a deputation from the county of Oxford, which came there to request that that county might be selected as the one in which the Society's show should be held in the year 1859. All who were present on the occasion were struck with the amenity of manner, the zeal in the cause of agriculture, and the aptitude for business evinced by his Grace in addressing the large auditory which was assembled; and if the deputation did not succeed in their object, their disappointment was at all events attended with this advantage, that it tended to convince the agricultural community and the public at large that no amount of influence could deter the members of the Council from exercising their judgment impartially and deliberately in the decisions which they came to, on matters of deep interest to the Society (Hear, hear). For his own part, he must say he thought the Council had made the best selection; and if they had given the preference to a county which was better entitled to it than Oxford, he trusted no unpleasant feeling had been created by that circumstance. Nothing could be more courteous or gratifying than the manner in which his Grace had received the request that he would allow himself to be nominated for the office of President; his Grace having observed that, while he should shrink from entering into competition with any other candidate for the post, he would undertake the duties of the office if it were the wish of the leading members of the Society that he should do so. He (Mr. Barker) was to have seen his Grace that morning; but instead of that he had received from him a letter, which he held in his hand, written from the House of Lords on the previous day, in which he said that he now waived all objections to his nomination, and would leave the matter in the hands of the meeting. Under these circumstances, he felt great pleasure in proposing that the Duke of Marlborough should be the President of the Society for the year succeeding the Chester Meeting (cheers).

Lord **Feversham** felt very great satisfaction in seconding the motion. As a relative of the noble duke he might perhaps be suspected of some partiality in the matter, but he was sure the meeting would give him credit for sincerity when he said that he would not consent to second the nomination were he not convinced that the Duke of Marlborough was a person who would discharge the important duties of the presidency with great credit and advantage to the Society (Hear, hear). It was, as they were no doubt all aware, not long since his Grace succeeded to his title and estates; but he (Lord Feversham) knew that during the time which had elapsed since the death of the late Duke he had engaged largely in agricultural pursuits, and that he was devoted to the science and practice of agriculture. He had great satisfaction, therefore, in seconding the nomination, and he felt the strongest confidence that the Society would have reason to rejoice in the choice which was, he hoped, about to be made.

The motion was put, and carried unanimously.

On the motion of Mr. **Joseph Druce**, seconded by Mr. **Jonas Webb**, the Trustees were re-elected.

On the motion of Mr. **Milward**, seconded by Col. **Nelson Hood**, the Vice-Presidents were re-elected.

After the votes had been taken in the usual manner, it was announced that the members of the Council recommended for election had been elected accordingly.

Mr. R. **Barker**, Chairman of the Finance Committee, then read the following balance-sheet:—

HALF-YEARLY ACCOUNT FROM THE 1ST OF JULY TO THE 31ST OF DECEMBER, 1857.

Receipts during the Half-Year.

	£	s.	d.
Balance in the hands of the Bankers, July 1st, 1857	989	8	10
Petty Cash Balance in the hands of the Secretary, July 1st, 1857	16	6	7
Dividends on Stock	134	18	4
Governors' Life Compositions	90	0	0
Governors' Annual Subscriptions	70	0	0
Members' Life Compositions	168	0	0
Members' Annual Subscriptions	506	1	0
Journal Receipts	139	5	3
Country Meeting Receipts:—			
Salisbury	2805	10	4
	£4919	10	4

Payments during the Half-Year.

	£	s.	d.
Permanent Charges	178	12	6
Taxes and Rates	17	2	6
Establishment Charges	450	1	11
Postage and Carriage	18	15	10
Journal Payments	171	10	2
Veterinary Grant	100	0	0
Veterinary Professors' Expenses abroad	117	2	6
Chemical Grant	150	0	0
Country Meeting Payments:—			
Salisbury	3366	8	7
Sundry Items of Petty Cash	3	12	11
Balance in the hands of the Bankers, Dec. 31st, 1857	331	15	11
Petty Cash Balance in the hands of the Secretary, Dec. 31st, 1857	14	7	6
	£4919	10	4

Thos. Raymond Barker, Chairman,
C. B. Challoner,
Henry Wilson.
} Finance Committee.

Examined, audited, and found correct, this 21st of May, 1858.

George I. Raymond Barker,
William Astbury,
Joseph Druce.
} Auditors on the part of the Society.

On the motion of Mr. **Pickin**, seconded by Mr. H. **Corbet**, thanks were voted to the auditors for their services in auditing the accounts.

The **Chairman** said he hoped that special attention would be paid to the report of the Veterinary Committee. It was very desirable that the members of that Society should know that if their animals were seriously affected by any peculiar disease, they might secure an inquiry into the matter, by sending specimens to be examined by gentlemen connected with the Society, in London; and further, that in fitting cases the Council would send a professor to any part of the kingdom, to examine into the causes of any disease which happened to be prevalent in the district. His Lordship then inquired if any member present had any remarks to make, or any suggestion to offer, which might be referred to the Council for their consideration?

No response having been made to this appeal,

Col. **Challoner** said he was quite sure that the motion he was about to propose would meet with unanimous concurrence. Both those who were and those who were not members of the Council would agree with him that Lord Berners was entitled to the best thanks of the meeting for the efficient manner in which he had performed the duties of the Chair on that occasion, and also for the very constant attention which he had given to the affairs of the Society ever since the time when he was elected President. (Cheers). There had been very few Presidents, since the formation of that Society, who had bestowed more time on the affairs of the Society than the noble lord who then filled the chair. His Lordship's presence rendered it impossible for him to say all that he might otherwise do on that subject; but he did feel, as a member of that Society from its commencement, and as one who had always taken great interest in its proceedings, that they were very much indebted to the noble lord for the services which he had rendered during his tenure of the office of President. (Hear, hear.) He begged, therefore, to propose that the thanks of the meeting be given to Lord Berners. (Cheers).

Mr. **Cavendish**, M.P., seconded the motion, which was put by Col. Challoner, and carried by acclamation.

The **Chairman** said, when he was elected President he considered that a very high honour had thereby been conferred upon him, and he rejoiced that his conduct during his Presidency appeared to have given satisfaction to the members.

The meeting then separated.

WEEDS AND WEEDING.

My last paper chiefly referred to the eradication of weeds from the fallowing lands. This however is but a small part of the subject; and as my aim is to make these papers practically useful, I do not intend to give any detailed description of the weeds of agriculture further than will suffice to bear upon the question as to the best means to insure their extirpation. A simple enumeration of the names of many of these worst pests to good cultivation will enable every experienced farmer to recognise them. It will however be necessary to my purpose to give some slight notice of each specimen of these weeds, in connection with such suggestions as may be presented to me, in passing, relative to their habits of growth, injurious tendencies, and modes of destroying them. First,

The Weeds most commonly infesting Corn Crops.—They are principally the following (I give their most common names): The thistle or saw-wort, dock, or curled dock, carlick or ketlock or charlock, red poppy or canker weed, goldens or corn marigold, corn bind weed, daisy weed or gowans, darnel or drauk, cockle, blue-bottle or knap weed, wild carrot, kecks or hemlock, hariff or cleavers, fat-hen or wild spinage, willow weed, hog weed or wire grass, sow thistle, wild oat, field scabious, fox-glove, hemp nettle, fumitory, rag wort, wild parsnip, and many others. These are the most injurious weeds as growing up with, and interfering in, the progress of the crop. There are many others which are denominated under-weeds: they do not greatly interfere with or impede the growth of the crop itself, but prevent the spreading of the roots, and do great injury in its early stages. They are not so exhausting to the soil as those of larger growth, but they prevent that free circulation of air and moisture to the roots so essential to a healthy plant. They consist chiefly of the following sorts: Corn mint, shepherd's or crowneedle, chickweed or stitchwort, dandelion or horse-gowan, colt's-foot or clay weed, toadpipe or mare's-tail, twitch or squitch, black grass or slender fox-tail, groundsel or grunsel, earthnut or pignut, buttercup, ass's mart or biting persicary, persicary or passion dock, spurge, borage, louse-weed, rest harrow or wild liquorice, field madder, &c., &c.

The Thistle, or Saw-wort.—These are in great variety, and common everywhere. It is almost impossible to effect their destruction in the early stages of growth. In corn crops they must be kept down by hoeing and spudding; but on grass lands it is better to permit them to attain a size sufficiently strong for the nippers to draw them up, or the spud to cut them below their crown. In some cases it may even be desirable to let them produce seed; but before it is shed the whole should be mown and carried off the field. Many fields have been in dry seasons thus cleared.

The Dock or Curled Dock.—This is a very hardy and injurious weed, to be found everywhere. Its roots are extremely tenacious of life, and it sheds a vast produce of seed, which are so hardy that after becoming food for birds they are deposited all over the farm for future growth. Hoeing and spudding may retard their progress, but nothing is effectual but drawing them up and carrying them off the field, or burning—nearly every particle of root will grow.

Charlock, or Ketlock.—These are great pests, and ought to be constantly attended to, or the field will soon become yellow with their flower. The weeding and drawing must be continuous, none should be left to ripen their seeds—even where they most abound this must be prevented. With judgment, patience, and perseverance they may be got rid of. No soil will yield two good seed crops. Topping is a very partial palliative: they come as thick as ever next season. It is almost a hopeless task to exterminate them from poor soils, where they so thickly propagate; but it must be done before these can be profitably farmed; they must be resolutely dealt with.

Poppy, Red Poppy, Canker Weed. — Light soils and lands well pulverized are most subject to this pest of the field. They abound generally in hot seasons, with occasional showers — "poppy years." The rapidity of their growth is surprising, and they often make their appearance when the crop is in an advanced stage, which makes their extermination difficult. Hence poppy extirpators are of only partial service. Hoeing deeply, and very careful hand-weeding, is the best course to pursue in this case.

Goldens, or Corn Marigold. — These infest many upland soils and inferior clays very injuriously, and are with great difficulty kept under. Early hoeing and constant weeding is the chief resource to keep down a weed of this kind, for its growth might be called successional.

Corn bind Weed.—This is of the class called climbers, and most seriously affects the crop where it is heavy and laid, actually fastening it close to the ground. Its roots penetrate the soil very deeply, and its seed is hardy and yielding. It abounds in clayey loams, and is one of those weeds whose seeds injure the samples of corn. It requires more than ordinary attention to expel it from the farm. Hedgerows abound with it. It creeps almost unseen along the surface-drains and roadways, and the seeds are carried over the land by birds, as in the case of docks. Hand-hoeing and weeding are the chief resorts, followed by continuous raking with long-toothed hand-rakes.

Daisy Weed, or Gowans.—These, like the corn marigold, infest poor clays greatly, and are of similar habits, and require like means to rid the land of it. It is not so successional in its growth.

Darnel, or Drauk.—This is a kind of brome grass, and grows very like oats as to habit; and as it can scarcely be distinguished from the corn whilst growing, it cannot readily be weeded out. Care should be taken not to sow it, as it is an annual, and generally sown with the seed corn.

Cockle.—This is a very pernicious weed, as greatly infesting corn samples, and detracts from its value. The seed is numerous, is rough, and almost black; it can readily be dressed out with proper sieves of seven wires to the inch. Millers dislike it much, as the seed breaks fine and discolours the flour. Weeding may do great service. Never sow it with the seed-corn.

Blue-bottle, or Knap-weed.—A common weed on all sandy soils, and hard to eradicate, as are all those of a similar class. Unwearied attention must be given to rid them.

Wild Carrot, Hemlock or Kecks, Fat-hen or Wild Spinage, and **Wild Parsnip** are all very obnoxious intruders upon our crops, and are of similar growth and habit. Some of them are more seen in hedge rows and ditch banks, &c. They grow rapidly, and occupy large breadths, and are thus very detrimental to the crop. Early hoeing and pulling is the best course with them. The wild spinage is most injurious to the crop, and produces a large quantity of seeds; this seeding must be prevented.

Hariff, or Cleavers.—This is a highly-injurious weed. It is a most tenacious climber, dragging down the finest crops where it abounds, and its seeds are a great drawback upon samples of corn. Early hoeing is best, and subsequently close hand-weeding, and afterwards, as for the corn bind weed, the crop should be raked over and over.

Willow Weed, Hog Weed, Knot Grass or Wire Grass (in variety), Persicary.—These are of extremely hardy growth, and produce an astonishing crop of seed, which grow immediately they are shed, so as to bring forth innumerable plants. They will speedily spread themselves and occupy all the soil, and thus destroy the crop if not quickly looked after. Deep hoeing and constant weeding will alone suffice to keep them under. Their seeds are very hardy, and ought to be dressed out of all seed corn.

Sow Thistle.—This is one of the most provoking of the weed tribe. It is of such rapid growth when once it takes a good hold of the soil, that it is continually making its unlooked-for appearance after weeding is concluded and the crop is pronounced cleanly weeded. This is a fibrous or creeping-rooted weed, and is best destroyed in fallowing. It is a great pest to an inferior crop of beans or peas. The winged seed fly a long distance.

Wild Oats.—This is a woful pest on poor clayey loams, and a very general weed elsewhere. It grows rom roots as well as seeds, and, like darnel, it is not seen till almost too late to weed it out, without great injury to the crop. On rich loams it grows to a great height, towering above the general crop in a most unsightly manner. Never sow a wild oat; weed them out if possible.

The Field Scabious, the Fox-glove, the Fumitory, the Hemp-nettle, the Ragwort, and many similar weeds of the like habit of growth.—These are all of the class of tall-growing weeds that impede the progress of the growing crop by taking up the required space for it. They are not of such inveterate hardihood as to defy the hoe or spud, but are more readily brought under by its destroying cut. The same constant hoeing and weeding are requisite for all, and the same careful forethought is needed to prevent their increase.

We are apt to think farming would be an easy business if it were not for all the anxiety consequent upon such comparatively trivial matters. Why it is nothing. What is common life itself, amongst common people, but a succession of like trivial things? Seldom more than petty successes; petty troubles, petty trifles every day attending us. What need for circumspection in all our conduct! What necessity for constant weeding.

I now come to those under-weeds which are so injurious to corn crops, *i. e.* twitch or squich, black grass or slender-foxtail, butter-cup, corn-mint, shepherd's or crow-needle, chickweed or stitchwort, dandelion or horse-gowan, coltsfoot or clayweed, toadpipe or marestail, groundsel or grunsell, earthnut or pignut, ass's-mart or biting persicary, persicary or passion-dock, louse-weed, rest-harrow or wild liquorice, field-madder, &c. &c. Having especial reference to practical usefulness in these papers, I must necessarily be as concise as possible.

Twitch, or Couch-grass, &c.—This is a highly injurious weed to a corn crop. It is classed by botanists in the same genus of grass as wheat, but it is totally different in the growth of its roots, for they are found to run underground in every direction, and it does great damage to every corn crop where it abounds, by its roots running into the soil, in and about the roots of the corn plants, so as to impede their growth exceedingly. There is no help for this case, but in repeated hoeings, so as to check its growth, The roots will remain till the next fallow. Great care should invariably be given to fork it out before seeding.

Black grass, or Slender Foxtail, commonly called Natural Grass.—This is very detrimental to the progress of the corn crop. It has not a strong creeping root like twitch, but it is almost as difficult to destroy; besides, it sheds a large crop of hardy seeds, which are much relished by birds, so that by roots, and by the diffusion of its seed, it is largely propagated. Constant hoeing is the only resort during the growth of the corn; and immediately after harvest a good harrowing should take place, to cause the seeds to vegetate, when the young plants may be mostly destroyed by ploughing. The old plants must be eradicated in the next fallow.

Butter-cup Ranunculus.—This is very common on some soils, and is of very tenacious growth and habit; large fibres are thrown out from the globular bulbs, and they abstract much virtue from the soil in supporting this determined intruder. These may be dug out, but it is an expensive operation where they greatly abound. Early and continuous hoeing will prevent injury to the growing crop to any extent; but a good fallow can alone destroy them. Care should be taken that they do not shed their seeds.

CORN-MINT, SHEPHERD'S OR CROW-NEEDLE, LOUSE-WEED, TOADPIPE, AND GROUNDSEL, are very similar in their habit of growth, and require much hoeing and hand-weeding to eradicate them. The *corn-mint* has a larger and more hardy root, which will live for three or four years, and can scarcely be got rid of except by fallowing. The *shepherd's-needle* has a very unsightly appearance in a corn sample, and detracts much from its value. The *toad-pipe* is very wiry, and a large crop of it is a pretty sure forerunner of mildew in any succeeding crop, owing to the flint it extracts from the soil. *Groundsel* is a quick-growing plant, and if not speedily overtopped by the corn crop becomes a great bane, particularly on good loams. The *Louseweed* is chiefly seen in the stubbles on good loams. It comes late into flower, and not being well weeded out, it gives the wheat-stubble a slovenly appearance. I have only to repeat that the same process of hoeing and hand-weeding can alone mitigate the evil; but I would recommend the last hand-hoeing to take place as late as it can possibly be done, without damage to the crop. Late weeds require protracted weeding. Groundsell does great damage to young clover.

CHICKWEED, OR STITCHWORT.—This weed is often slightly treated of by our writers, but on fine friable loams it is a very pernicious weed. We have frequently seen crops of turnip-seed all but destroyed by it; and in thin wheat crops it flourishes surprisingly. Its roots are very minute and wiry, and find their way everywhere. Its seeds, too, propagate very early, and are extremely hardy, and are diffused over the land thickly by linnets. The only remark I would make here is, that, as it is lightly thought of, it is often neglected and left to propagate freely, often to become one of the worst banes to the farm.

DANDELION OR HORSEGOWAN, COLTSFOOT OR CLAYWEED, EARTHNUT OR PIGNUT.—These possess very similar roots as respects their tenacious hold upon the soil. The *Dandelion* and *Pignut* are less detrimental than the coltsfoot, but they do considerable damage in impeding the growth of the corn plant. The *Coltsfoot* is one of the most obnoxious weeds we have; it is the earliest of spring flowers, and almost before other weeds are seen, its cotton-looking seeds are flying all over the lands; besides, it has a perennial root, nearly as bad as twitch, which finds its way as freely under ground, and is as hard to destroy. Many ways are resorted to for its destruction: one is to pick off its flowers; but the root-stock or eye is so tenacious of life, that it soon throws out more. It is a good plan to dig it out at flowering time; but only clean fallowing can destroy it. Pigs are remarkably fond of pignut, and similar roots, and the tending of such on fallows is often of great service in making a clean fallow.

ASS'S-MART OR BITING PERSICARY, PERSICARY OR PASSION DOCK, REST-HARROW OR WILD SPINACH.—These are of very similar character in growth and habit. The *Rest-harrow* has a perennial root, tough, strong, and woody, but is not very abundant, and chiefly in slovenly fields. The *Persicaries* are a very vile weed on good soils; they are so hardy and prolific, both in seed and plant. On some soils, and when at full growth, it is with difficulty that the hoe can be made to cut through the root, and the crop of seeds is so extraordinarily great, that a few plants would seed a field. These, and all other plants producing great abundance of seeds, ought to be had under especial supervision by every cleanly farmer. They are annuals, and their little thickly-clustering plants almost escape notice in early weeding; but if left uncut they eventually show themselves in great profusion. It is these, and such as these, *i. e.* red poppy, hariffs, cockle, *fat-hen*, groundsel, chickweed, and some of like habit and appearance as young plants, that do so much harm in so many ways. In the first wheat hoeing most of them have not made their first shoot above ground, and it is by this very hoeing or culture that some of them are caused to vegetate. Farmers are often perplexed and teased to see these late weeds making such headway in the crop when it is too late to weed them out; for, although these under-weeds do not injure a full crop, they are very troublesome in a thin or light crop, and the expense of keeping them down is often very considerable. The most desirable and judicious course for every farmer to pursue, with reference to the weeds of his farm, is to give them no rest. At all times and seasons he must keep a sharp look out upon them, and wherever found make an effort to destroy them. The "higher" he farms, the more care will he require. High cultivation on a rich soil will in a remarkably short time bring many varieties of weeds to perfection, and grow others so strong and vigorous as almost to defy the hoe; or, if he is not on the alert, they grow so fast as to make their extirpation a very expensive matter of business. On all open well-manured soils it is a most difficult thing to pursue cleanly farming: either the crop must be given up for cleanliness, or there is great hazard of a foul one, and the farmer has often such perplexities to contend with. At all events he must keep his weeds under, and if my observations on this subject shall lead to any more strict surveillance of the farm, I shall be abundantly gratified.

SCOTCH COTTAGES.

The Highland Society of Scotland, which has done so much for the improvement of husbandry and the advancement of that country—and it may be said for the improvement of husbandry generally—among other worthy undertakings, offered their medal for designs of labourers' dwellings. The dwellings of the working classes have needed improvement there as much as in Ireland, and more than in England, because, being constructed when the country was poor and backward, now that it has become rich and thriving the old type of cottages was kept up, and they had become a shame to one of the foremost countries in the world. Scotch landowners thought little of this; but as the country, since the opening of railways, has been threaded by Southern visitors, the dwellings have been looked at with another eye, and it has been felt they are an eyesore to the land. Beyond a certain height, no field can be made more fruitful, and year after year must it be kept fruitful by new manures and by opening up drains; but houses last many hundred years when well made, and are a part of the national stock and wealth well worthy of care. Many of the houses in England, Flanders, and France are two or three hundred years old; and year after year, as the people grow, a few more houses are built, and the stock is kept up without any very heavy call on the labour of the year; and in a well-settled commonwealth the houses are good, strong, and well built. It is strange, nevertheless, to see the diversity of provision under this head, even in the same country; for there are parts of England with hovels; and in some parts, with stone quarries, there are mud huts; and in others, where the bricks have to be made, the houses are not good.

Scotland, it is owned, has been far behind in lodging her people, both among the Erse in the Highlands, and among the English and Danes in the lowlands and on the east shore. Her leaders are, however, awakened, and a great endeavour is made to meet the want; and as there is stone enough, and lime enough, dwellings will now be got which will last for hundreds of years. As this endeavour is to be made, it is to be wished it will be worthy of the times, and that we shall not have a stock of hovels instead of good houses. The Highland Society, feeling this, asked for designs, so that landowners and others wishing to build might have a groundwork, which could be dealt with according to means and circumstances. The medal given by the Society was won by Messrs. Hickes and Isaac, of Northgate-street, Bath, who sent in three sets of designs. One of these was for one chamber and one living-room; another, for two rooms above and two below; and a third, for three rooms above and two below. As we have lately spoken of the Irish prize designs, we think it useful to say something about the Scotch designs, which are meant by Messrs. Hickes and Isaac to meet the wants of the Scotch landowner and workman.

Messrs. Hickes and Isaac considered the system of Scotch husbandry to be such that it would be unwise to confine the cottages to one type, and therefore they provided a variety of designs. They bestowed great care on making provision for ventilation by means of air flues, and warmth and domestic convenience have likewise been studied. The privy is placed some short distance from the house at the back, and is provided with a freestone riser and a deal seat, the soil being conveyed by a syphon-pan into a cesspool, so as to be used for manure. The materials specified for the buildings are such as can be obtained in the locality for which they were designed. The elevations are of the simplest character, having dressed joints and mullions, and no attempt is made at display of any kind. The roof is without valleys, and of the simplest construction.

In the five-room cottage the entrance is by a porch of 6 feet by 4 feet, the object being to prevent the rush of cold air into the living-rooms, which is necessarily hurtful in a bleak northern climate. The porch leads into a living-room 13 feet 6 inches by 12 feet, and from which the stairs lead to the upper storey. Under the staircase is a closet. The living-room leads to a scullery 9 feet 6 inches by 11 feet, in which is a pantry. A door leads from the scullery into the back-yard. In each room is one window. On the upper floor is a parents' bed-room 9 feet 6 inches by 12 feet, with a chimney; a boys' bed-room 9 feet 6 inches by 11 feet, with a chimney; and a girls' bed-room 9 feet by 7 feet 6 inches, without a chimney. In each room is a window, and there is a window to light the staircase.

The four-room cottage is entered by a porch which leads into the living-room, 12 feet by 12 feet, and in which, as in the other cottage, the floor is of wood, as well as that of the scullery. On each side of the fireplace, which is fitted with Nicholson's grate, is a hot closet and a coal closet. The window-shutter is made so that it will form a table when needed. The same can be introduced in the other cottage. A door leads from the living-room into the scullery, which is 10 feet 3 inches by 8 feet, and has one window and one outer door. In one corner is the staircase, and in the other a meat-safe, with a coal-closet underneath. The meat-safe communicates at the back with the window.

On the upper floor the parents' bed-room is 12 feet by 12, with two windows, and Pearce's fire-lump grate in the chimney. On each side of this one hot closet and one common closet. The children's bed-room is 10 feet 3 inches by 8 feet, and has one window, but no chimney. It should be mentioned that the flues springing from the lower rooms are carried through the parents' bed-room. The staircase is lighted by a half-window in the middle of the double cottage. A good supply of windows is a great benefit in a common cottage, and Messrs. Hickes and Isaac have so provided that there shall be thorough means of ventilation for the sleeping-rooms of the cottages. What, however, they cannot unhappily provide for is that the inmates shall open the windows, for they will long keep their horror of fresh air. The architect wants the schoolmaster and the clergyman to help him, or his labours for the health of the people are too often in vain. The people must be taught the use of a good house, and how to take care of it, for the dwellings of the poor are oftener abused than used.—Building News.

CENTRAL (STIRLING) FARMERS' SOCIETY.

DISCUSSION ON THE VARIOUS BREEDS OF CATTLE.

At the recent annual meeting of this society, held at Stirling, G. B. Home, Esq., of Argaty, in the chair, the following discussion on the various breeds of cattle took place. We wish that such discussions were everywhere the rule, instead of the absurd plastering speechifying which we too often meet with.

After the usual loyal toasts,

The **Chairman** proceeded to introduce the discussion on the various breeds of cattle. He said—I am not sure whether the present is the proper time to introduce this or not, especially when there is a good deal of hot punch going. However, if you allow me, I will make the few remarks I have promised to do. My own opinion is that such a practice introduced among us after our dinners may be of great use to the society, and give us in going home something to think of, perhaps more pleasant and beneficial than toast drinking. I believe we must all acknowledge that agriculture has now attained the position of a high science. There are many ways in which in other professions there is an interchange of thought; there are mechanics' institutes and other societies, where scientific men may meet and improve each other by an interchange of opinions; while many farmers, when they meet, are generally contented with bumper after bumper, and paying fulsome compliments to each other. In all this I can see very little fun, one way or other; whereas, if there was a system of discussing agricultural subjects at such meetings, a great deal of improvement might be got both by those who joined in the discussion and those who listened (Hear, hear). On the present occasion I feel rather nervous in undertaking to introduce the subject of my remarks to this meeting; but I hope that the more flourishing our society becomes, and the greater number of members who join us, the less will such diffidence or difficulty be felt by future speakers, till we have an unreserved scientific discussion on all subjects connected with agriculture. People who know nothing about it may laugh as they like; but I have no hesitation in saying that the science of agriculture requires, for its proper application and development, the highest intellect and the best education that man can receive. To carry out agriculture to perfection requires a knowledge, aye, and an intimate knowledge too, of a number of deep sciences. If a farmer is to know anything about his cattle, he must have a good understanding of the anatomy and physiology of these animals; he must know something about how to cure their diseases. In the cultivation of grain, the farmer must possess a knowledge of chemistry—of the various kinds and properties of manure, and what manures should be used for a particular kind of grain. In fact, a farmer must be ever on the stretch—all his faculties on the alert; and if he carry out agriculture properly, it must be by a high cultivation of intellect, and by an immense amount of perpetual observation. He has not only to sow the seed and see it grow, but he must be able to see what has caused it to ripen perhaps sooner than before, or what has tended to prevent it coming to maturity as it ought, or what has caused it to survive blight. In fact, there are a thousand things which a farmer has to do, and which, to be done properly, require a mind of a high order. Indeed, the highest in the land are only too happy to be considered good and intelligent agriculturists; and, however things may have gone in time past, depend upon it, agriculture will take that high place among the sciences which it so thoroughly deserves, if it be carried on in a manner corresponding with the magnitude of the interests it involves. I have undertaken to bring before you this evening as a subject of discussion the breeds and breeding of cattle. I do this because I have been an anxious observer upon these subjects for at least 30 years, and have, during that time, lost no opportunity of gaining information; and if there is one subject upon which I have a chance of talking agreeably I think it is this. I shall endeavour to speak in such a manner as to draw on the present company to say what their opinions are, and I hope every one will join in the discussion so far as any idea strikes him, and give us all the benefit of that idea. I begin with the aboriginal breeds. In the parks of Cadzow, and at Chillingham, in Northumberland, there are cattle said to be the original breed of this country. I confess I have my doubts as to whether the white breed be the aboriginal one; but I am rather of opinion that, if we have an original breed at all, it is our unsurpassed Argyleshire. I do not specify Argyleshire distinctly as if I referred to a breed peculiar to that county, but I speak of our well known black cattle, which, although reared in many parts of our country, are yet shown to greatest advantage and perfection in the county I have named. It cannot fail to be observed that good specimens of our black cattle possess almost every point that the breeders of cattle of England and elsewhere are endeavouring to produce. We all know their fineness of hide, straightness of legs, length and breadth of hind quarters, fine development of breast and chest, and we know that that breed which is most highly esteemed, so far as you can compare a large beast with a small one, is almost exactly the same. The quality of their flesh is considered wholly unsurpassed, there being a fine degree of marble mixture of fatty matter which cannot be surpassed. It is well known that the nobility and gentry of England get up our Scotch kyloes as their finest beef. They are in a half wild state, and must be fed fat upon grass, for the Highland ox takes as long to get accustomed with a byre as another to be fed fully fat in it. As milkers, they do not excel in quantity; but the quality is shown by the manner in which they suckle their calves. I need not dwell upon this breed, but go on to a peculiar breed, viz., that reared in Galloway, Aberdeen, Kincardine, and Angus. How that breed has come to be what it is, forms a difficult question. Whether they are a species of the West Highlander somewhat changed, and having lost their horns, I don't know; but there is a peculiarity regarding them. Those in Galloway are larger and thinner from the heuk to the tail, though not so broad as others; while those in Aberdeen are broader over the back. It may be mentioned that the latter county has at this time the honour and glory of supplying what in the London market is called pure Scots, and they carry the highest price for beef in the London market. In regard to their milking properties, I have the authority of Mr. M'Combie, of Tillyfour, that they are excellent milkers; and he scouted the idea of an Ayrshire being compared with them in Aberdeenshire. I may mention that his place is by no means a garden of Eden, being without shelter on the top of a hill, and yet there are to be seen some of the most magnificent animals you can conceive. Long may the Aberdeen folks have the credit of producing the best Scots for the London market. There is another breed, called the Fife breed, which is said to have been originally a Dutch breed; but they are very few in number, and are not increasing. There are, perhaps, some present who can say something more about them than I can. I now come to the Ayrshire breed, which is one with which we have a great deal to do. That breed is generally allowed to be superior to all others for quantity of milk. The Ayrshire breeders have, for many years, been driving at that point, namely, good milking qualities, and I regret to say that I fear they have done so to the neglect of the feeding qualities. A recent writer, speaking of Ayrshires, says, that one cause of the pleuro-pneumonia is that they are bred too fine, and I am of opinion that there is some truth in this. The same writer also said, that if a breeder has a first-rate bull, he was put to his nearest relations—to his own mother, daughters, or cousins, thus breeding too much in-and-in. Whatever causes operate to produce the effect, I do not pretend to say; but it is an acknowledged fact that the Ayrshire breed are deficient in beef and growing qualities. They are, generally speaking, narrow in the chest, and cannot have a large development of lungs, so that they may be predisposed to take injury or catch cold. In regard to pleura, it is a disease the result of a cold which has hung about the animal for many months without being observed, till it could no longer escape observation, and I believe a great deal of it results from cattle being turned out too early in the spring, and left out too long in autumn, and being allowed to hang upon their legs at the gate of a field, doing no good whatever. If we go to the original of the Ayrshire breed, it will be difficult to call it a pure breed; for Mr. Orr, of Grougar, and Mr. Campbell, of Cessnock, brought Holderness cattle to Ayrshire, while Colonel Dunlop also introduced cows from Guernsey and Holland; but of whatever blood it be composed, there can be no doubt that the breeders have been successful in producing a highly esteemed description of cattle. It is quite possible for a person looking about him in Ayrshire to see the difference between the breeds. Near Kilmarnock the cattle are tolerably broad in the hook, having white muzzles, and a decided dash of the short-horn. Yellow and white cows denote the Guernsey breed, while dark brownish red and tawny muzzles betoken the Alderney cow. I happened to be at a meeting at Cumnock some years ago, and saw there what was reckoned the best bull in Ayrshire. Geordie was his name, I think, and he was the property of Mr. Finlay, of Lyonston. He was of a beautiful dark colour, with horns turning up. I said, "You may call that bull an Ayrshire if you choose; but if there is not West Highland blood there, I don't know where there is any." I was afterwards informed that one-eighth of his blood was West Highland. I remember a description of Ayrshire cattle with horns turned in towards the eyes. This was called the Crummie horns; and so completely was this understood, that a good milk cow was called a crummie. It has been found that fashion insists that the horns of Ayrshires are to be turned up, and screwing has been resorted to for that purpose. But a little dash of the West Highland settles that, without any screwing at all. [The speaker then went on to defend the crossing of breeds, as it was only by that means that a perfect animal could be raised, and then went on to speak of the short-horned breed. He said:] The introduction of short-horns may be of signal benefit to this country; but I am not far from thinking that if you keep them according to the present English rules you will not be greatly benefited by them. Some of the means at present adopted go to deprive the animal of its milking powers, and render it unnatural in its inclination to take on fat; but if they are made to keep in a good fair growing, breeding state—in fact, in that state of exuberant health which makes them suitable for breeding—the country would greatly benefit by their introduction. Unfortunately, the great run has been upon shape only, to the neglect of milking and breeding qualities. I may mention, in confirmation of my remarks about the fattening of the short-horn, that I was at the Newcastle show of the English Society some years ago, and was going round the yard with Mr. Booth, of Killerby. He was reckoned the first breeder of fat stock in Yorkshire, and was only equalled by Mr. Bates, whom he never liked to meet, so close was the competition. Mr. Booth's cattle were very high fed; and one cow he had at that show—Necklace, I think, was her name—was as magnificent an animal as one could wish to behold: but then she had, as it were, pillows of fat sewed on to her hind quarters and along her back. I remarked that the calves of such an animal must be very valuable. He answered, "I am sorry to say I have been rather unfortunate in that respect; the calf died." After expressing my regret, I said, "Do you not think she is rather fat?" He said that "Perhaps she was a little." I saw other three cows—Faith, Hope, and Charity, I think he called them—raised from this same Necklace, and more magnificent animals no one could wish to see; but I heard shortly afterwards that he had given up the whole thing, and that he did not again appear as an exhibitor. On the other hand, Mr. Bates, instead of feeding to such an enormous extent, kept his cattle in first-rate breeding order. He told me he had got a lot of West Highland heifers, and had put short-horn bulls to them; thus producing the most admirable animals he ever saw, pictures of many of which he had hung on his walls. We must all, I am sure, regret the serious loss which has occurred at Keir, in the loss of the celebrated bull John O'Groat. I, for one, however, was not altogether unprepared to hear of such an event. If an animal is fed up to a state quite unlike healthy nature, as the rage is at present, what else can be expected? The object of what I have attempted to say is, that we should endeavour to get that which best suits our purposes by judicious crossing; and I think, whether for eating, or show, or breeding, the great point is to keep them in a good growing, healthy state, and not force them beyond what is good for themselves and those who are to use them. I have now come, I think, to the end of my tether; what I have said will, I hope, excite healthy discussion, and be the means of eliciting experience and information which may benefit us all (cheers).

Mr. **Stobie**, of Ballockneck, passed a compliment on the ability displayed by Mr. Home in his introduction of this subject. He was not so well acquainted with the Ayrshire breed as to express a decided opinion, although he knew a cross between the Ayrshire and the West Highland breed was a great improvement. The Fife breed was a coarse animal, and such as he would not recommend to breeders, although he must say a great improvement in this breed had been made by several parties. The West Highland was, as stated by the chairman, a most excellent breed, and had all the good qualities which most other breeds were deficient in. He recommended strongly a cross between the West Highland cow and the short-horn bull, but was generally of opinion that crossing could not be too judiciously gone about. They must begin with two first-class animals, and endeavour to get prominent in the one what was deficient in the other, and thought they should try to carry on a good breed, and not cross too often or on every point. He took leave to mention that he exhibited two cross-bred heifers at the recent show of fat cattle at Glasgow, one of which gained the first prize, and was out of a small Ayrshire cow, by a pure short-horn bull; and he must add, it was a very fine animal, and admired by everyone. He had no hesitation in saying the short-horns and first crosses were the easiest fattened breed, and in times like these, when the farmer must get his goods quickly to market, they were the best. If they got £12 or £15 for a year-old, and only some £18 for a two-year-old, they were not paid for the year's keep, and it was desirable to have that breed which was ready at the earlist date to go to market. He concluded by expressing his thanks to the Chairman for his remarks.

Mr. **M'Nellan** was delighted to see this mode of discussion introduced, and he only hoped that in future a programme would be drawn up, in order that all the members who chose might be prepared to speak if they thought proper. Regarding the subject of the discussion, he had found the short-horn the easiest fed, and a cross between the short-horn and Ayrshire exceedingly useful—in fact, as easily fed as the short-horns; and while he had reared this class to 50 stone, he could not rear an Ayrshire more than 35 stone.

The **Chairman** said he was very glad to hear a list of subjects spoken of. It could not have been done on the present occasion; but after the success which had attended the introduction of the method of discussion they had that night adopted, he was of opinion that the committee of the society should draw up a list of subjects, and allow each member to choose that subject upon which he had most information, or on which he could bring to bear the most personal experience and observation. The speaker then went on to remark upon the milking qualities of the short-horns being fully equal to the Ayrshire. All the dairies in London were filled with short-horns, and the Londoners were pretty well up to the way of getting most value for their money. He had known one short-horn cow that gave 18 Scotch pints (36 quarts imp.) of milk per day, and the amount of butter he did not recollect, but it was something immense; while at Keir he believed there was a short-horn cow which was a most magnificent milker. All this went to show that the short-horn breed contains all the good milking properties, but they had been destroyed by endeavouring too much to get a monstrous fat beast. He went on to say that the first cross of an Ayrshire was good, but the second was easier fed, and the nearer they approached the short-horns the easier would they get the fat put on. He believed that the first or second cross would turn out the most profitable for feeding and milking. There was one thing he was going to mention with regard to milking, namely, that if they took a quantity of Ayrshire milk, and a much smaller quantity of short-horn milk, there was every probability that the butter of the smaller quantity of short-horn is greater than of the larger quantity of Ayrshire.

Mr. **Kay**, of Hillhead, in a humorous speech, advocated the utility and value of the Ayrshire breed, but said that a great deal depended upon the keep and soil. In regard to crossing, he said he had tried it, and found his best plan was to come back to the pure breed again. He said there was no accounting for the differences between the richness of cows' milk. He himself had an Ayrshire cow that gave 18 pints of milk per day (36 quarts imp.), and only three pounds of butter in the week, while he had had a little cow whose milk produced a pound of butter daily.

Mr. **Gray**, of Bearside, remarked that it was almost invariably the case that premiums at cattle shows were carried off by the smallest cows on the ground; and if it were possible to grow large Ayrshires, why are premiums thrown away on these small trifling animals? He related an anecdote of his going to a friend of his to purchase a bull, and when coming away he saw an Ayrshire calf which could scarcely move about. He asked what was the matter. "Nothing," said his friend; "only we must starve the calves the first year to make them fine, or they would grow up large, coarse animals." Now, he appealed to them whether this was according to nature, to starve a calf in its first year, in order that it might be small and fine, instead of what nature intended it. A good deal was spoken about cruelty to animals, and when the races came off, some of their neighbours cried out about the cruelty of the thing. Here, however, he submitted, was a much grosser instance of cruelty to animals—starving them during their infancy.

Mr. **Chrystal** decidedly objected to the injudicious crossing, and above all things he thought that the breeds should be kept pure. If such animals could be got together as the Keir bull and Mr. Douglas's cows, he thought it would be madness to prefer crossing. He was of opinion that a shorthorn bull with Angus cows would make an excellent animal; but if such were done, he would stick to the first cross, and never cross again.

The **Chairman** hoped, after the animated discussion they had had, that at next meeting some equally interesting subject would be brought up, and if he might be allowed to suggest, he would say that cheese-making would be a most excellent subject. Some of the cheese made in the district was good, and some nothing to brag of. He did not see why they should not be able to make cheese which would command a sale in the Glasgow market, as that from Ayrshire does. If such a subject were determined on, it might be well to have a show of cheese on the same day, when the various prize lots could be brought to table, and the system of making explained (cheers).—Stirling Journal.

THE ENGLISH FARMER IN FRANCE.

Sir,—We compete with all the world in growth of corn, and are not allowed the same liberty with other crops. That seems hardly just—hardly *free trade*. And when the price of wheat is extraordinarily depressed, as, unfortunately, it now is, the unfairness of this must often present itself to the minds of your readers.

Tobacco is perfectly acclimated to the north of France. The climate is similar to ours; if there is any difference, the winds are colder than in England. Here it is abundantly grown, at a good profit, under the especial fostering care of the Government; thus greatly benefiting the farmer, enabling the cigar to be purchased for a *half-penny*, and receiving a revenue of more than our malt-tax.

I had the pleasure of paying a visit to Monsieur Lecat, at Bondues, about six miles from Lille, who is the largest and most successful tobacco grower in this department; he has received many medals from French and foreign societies, and the decoration of the Legion of Honour, and has also published a work on the cultivation of it, consequently I could not possibly have met with a gentleman more competent to give me the best information. He has the most extensive farm-yard and buildings I have seen. I could fancy it was an old-fashioned English homestead, with large pigeon-house in the centre, so often seen in England. The land about it is all the very finest loam, not a stone nor a water-furrow.

The history of tobacco may be stated in few words:—Found by Columbus in 1492, introduced into Europe 1560, deprecated by all; in 1624 Pope Urban VIII. excommunicated all who used it; 1674 it became more popular, and a duty was here placed on it, and the cultivation then began. In 1810 a decree was passed by the French Government, greatly promulgating its growth; and from thence, under many alterations of the laws relating to it, it has progressed to the present time. The expenses of growing it, per English acre, are as follows:—

	£	s.	d.
Ploughing, harrowing, rolling, carting..	2	16	0
The seed bed	1	12	0
Manuring £25, but half is supposed to be left for next four crops; so it is......	12	10	0
Manual labour	10	16	0
Sundries	1	10	0
Hail-storm insurance..................	0	18	10
Delivery, &c.	0	8	0
	£30	10	10

No small sum, but the return is often £50. The labour of it employs all the family of the small farmer, and the large one has the satisfaction of giving employment to very many of his poorer neighbours. It has been one of the principal causes of the total abolition of naked fallow, and the perfect cleanliness and heavy manuring of this part of the country.

There are seventeen species, but three only are sown; and of these, one (the large-leaved) nearly supersedes the other two. It is a fine plant, and has been known to attain the height of 7 feet 6 inches, with many branches covered with leaves; the flowers are of a purplish colour, the pods oblong, containing innumerable seeds. (Any gentleman wishing for any, if he inserts his address where to send it in the *Mark Lane Express*, I will give him some with pleasure.) One plant will produce 300 pods, and in one pod was counted 2,700 seeds, thus producing an increase of 800,000 for one. It will keep for years, and, unlike corn, requires no change of soil. Before you draw your plants from the seed-bed, select the forwardest for seed: it is ripe in October, and when cut is best hung up in a dry place, and not knocked out till wanted.

Choose a warm, protected place for the seed-bed; dig in autumn; leave it till February, then manure it well with rape-cake and pigeon's dung (here they do it at a cost of 4s. 2d. per rod !), and dig it in very shallow. Rake it very fine, and invariably between the 10th and 25th of March sow your seed, mixed with sand or ashes; cover it with branches to keep off wind and frost, and if there is no wall, surround it on three sides with *strawed hurdles* set up endways. You must also have a small bed sown ten days later, to produce plants to fill up blanks. From the moment of sowing, daily care is required; protection from grubs, weeds, sun, wind, frost, and drought. One-and-a-half rods of bed are required for every acre planted.

The field for planting must be free from trees; tobacco likes not shade. Prepare the ground as well as possible; it cannot be too fine: among other good reasons, it better bears a dry season. Liquid manure and guano are not allowed to be used by Government, as the whole cultivation of this plant is regulated by law. Only a certain number of acres are permitted to be grown in proportion to the size of the farm. Rape-cake is the best manure; it produces the handsomest and best flavoured tobacco: an acre requires three tons of it, and eighteen loads of dung.

Planting begins on the 25th of May, and it should be proceeded with as quickly as possible, as the later plants do not ripen so well as the others. To regulate the spaces they use wire chains, the links of which are 16 inches long, as that is the distance the plants should be apart, and the rows 20 inches. They are not allowed to plant thicker than 19,200 to the acre, nor thinner than 12,800. In dry weather you must not begin to plant till 2 o'clock; and if very hot, a small handful of wet chaff must be put to each plant, to remain for three days. The next operation is to mould them up. In about a month the heads are nipped off, leaving only eight leaves—requiring a skilful workman. This seems to promote suckers, which must be removed three or four times as they appear. In the beginning of September the harvest commences. Women strip the plants of the leaves, laying them in the next row already done, dividing the smaller ones from the others, as they are dried separately. A few hours are sufficient to prepare them for stringing into "garlands," and they are then ready to be carried to the drying-house. This is the most important part; on this greatly depends the quality and *classification* of the leaves. Six "garlands" are hung on a rod, and these rods are placed on other rods, which run the whole length of the shed; here they are protected from rain or damp, and constantly attended to, for twenty-five to forty days, according to the weather. You then choose a fine day to remove it to the granary, where it must be carefully surrounded with a wall of straw, to keep out the damp or air as much as possible.

The delivery of the tobacco to the Government factory at Lille commences at the beginning of January and ends in March; to effect this, the leaves must be sorted into four classes, and tied in bundles of fifty leaves each, and fifty bundles make a truss, tied with osiers. All leaves which have suffered from rain, hail, or imperfect drying, are classed as unsaleable. The *average* weight of five years' growth, from 1849 to 1853, in the district by Lille, was 24 cwt. to the acre. M. Lecal considers it by far the most profitable crop the farmer has. It strikes me it would be still more so in England.

The Government *buys all*, and fixes the prices annually: last year they were 117s., 92s., and 61s. per cwt. for first, second, and third classes. An ancient convent of immense size in Lille is applied to the manufacture; it employs 350 workmen and 400 women. The French tobacco is never used alone; it is mixed with all other sorts. The process of manufacture is very simple: Cleaned, sorted, heaped with strong brine and well heated, cut by a *chaff-box*, dried, damped and heated again, and packed. The cigars are the women's work. It all takes some time, but the snuff is the longest. After undergoing various processes for six months, it remains for a year in immense heaps of forty or fifty tons each, to acquire a scent, which it has not before. To be more minute would be uninteresting; suffice it to say little or no machinery is required, and had we the liberty, I am sure the farmers of England would immediately try it, and, I believe, with every chance of success. Why not, if it answers so well here?

Another favourite growth is flax. I will send you a more detailed account of it, as that is open to us, and I know the prejudice against it. Now all expenses of farming here are so similar to ours, that their profits are not a bad test if there is any advantage in adopting their crops.

I am anxious not to lose a day in forwarding to you the information I have obtained on the growth of sorgho, a plant which I believe will, in a very short time, become one of general cultivation in England, with great advantage to all stock-keepers, producing more food per acre than any other summer crop, and of a more fattening nature than any of our present produce grasses or soiling plants; equally good for horses, "cattle" both grazing and store, cows, sheep, and hogs; eagerly devoured by all, sheep perhaps liking it the best; and improving as well the quality as the quantity of the milk and butter. Cows that have had half-a-cwt. per day give a quart more milk per day.

So much do I think of it, that I shall leave no means neglected which may lead to the distribution of the seed, with instructions for sowing. The outlay of a few pence for sufficient to try its qualities and capabilities in English soils is so trifling, that I should think no one who reads your journal will neglect to embrace the opportunity I offer of so easily acquiring a knowledge of this valuable plant.

I admit we have not had many useful new crops introduced into England during the last twenty years, or which realized the anticipations caused by the flattering character given them at the first, such as trifolium and many others; but that is no reason for not making inexpensive trials when we are enabled to do so. One of the most useful seeds we could desire would be for an intermediate crop between the harvest and following spring. I do not say such is sorgho, but it may be so. If sown in

July it produces two cuts; so, surely, if sown in August it will produce one.

At all events here its utility is not problematical; it is an accomplished fact, but all its uses may not yet be developed.

It was introduced five or six years ago by Monsieur de Montigny, the French Ambassador at Shanghai, who also sent over the "igname" as a substitute for the potato—(More of this some future time) by sending new seed to the Agricultural Society of Paris.

In August, 1855, the Committee of Agriculture appointed a deputation to inquire into its merits. September 4th, they found at the farm of Monsieur de Daire, at St. Roche les Amiens, a small piece six yards by seven, which was then six inches high. They went again on the 22nd of same month, and found during these 18 days it had advanced to 30 inches.

Oct. 22, 1857, in the *Napoleonien Moniteur de la Somme*, was inserted: "Many of our farmers have had great success this year with the sorgho plant grown for hay. It has given most extraordinary crops: one piece produced at *each cutting* 21,000 kilogrammes on 42 acres and 20 centares. Now this is equal to 60 tons per English acre, for all the three cuttings—20 tons per acre each mowing."

March 7, 1858, the *Mercuriale des Halle*, at Marches, says: "Seven hectares were sown last year by Monsieur Noüel, at the farm Isle Commune, St. Denis en Val-Soiret. The produce of one cutting on one hectare *was weighed*, and it amounted to 73,000 kilogrammes; it was consumed by 80 fatting bullocks, and 10 horses, from Sept. 2nd to Nov. 10th." This is 30 tons per English acre at one cutting. These accounts may be looked upon as correct; there are too many officials here to give information to the authorities, and too many agriculturists anxious for the truth in this sort of statements, to allow me to think for a moment there is any doubt about them. In fact, I believe the Minister of Agriculture would cause the editor to be punished in some way, if he allowed untruthful statements of crops to appear in his paper. It does seem most enormous, and yet it is also added: "Had it been cut at twice, the amount of weight would have been much more." The land, no doubt, was as rich and as highly manured as almost any in the world. However, if we get two-thirds of this, we need not be dissatisfied.

In the South of France it is grown for sugar; sown one-fourth the thickness, and allowed only to produce one stem, which is harvested in October, and contains fifteen per cent. of sugar—the leaves being given to cattle. This I do not expect will ever be done in England, consequently I will confine my observations to its applicability to hay or cattle soiling.

It may be sown from the 1st of March to July; the early-sown producing three mowings, the later two. You cannot over-manure for it, as the coarseness of it seems not to affect the love the cattle have for it, nor its fattening qualities. As soon as land is ready, you hoe out lines two inches deep and a foot apart, and drop the seed in these lines from three to four inches apart. It is a very branching plant, and requires room: on a large scale, of course, it would be drilled. It is covered in the usual way, and in a couple of weeks is seen just coming through; in two more it is four inches high. You will now hoe it when you please: it will only require once doing, as it so smothers the weeds that they cannot grow. But being at these intervals, a horse-hoeing would not be a bad thing, with two horses, each walking in the furrows four yards apart, and two hoes following them, and at each end of the work the hoes being set one row nearer each other. In this way the plant is never trodden by the horses. I never saw this done except by the market gardeners near London, but it is an excellent plan. It seems not to be so rapid in its growth in its early phases as afterwards: for that reason it would not be amiss to steep the seed before sowing. In June it is a yard high, and fit to commence cutting. Should you prefer making it into hay, now is the time. It is said to lose two-thirds of its weight, but here they sadly overmake all their hay and clover. The latter end of June and July is a time when a crop like this comes in very conveniently for soiling—the tares are done, the first crop of clover is all cut, and the after-grass in the meadows is not yet ready. If not mown till arrived at full maturity, it attains the height of eight to nine feet; and, from what I have heard, I believe in that state, if properly harvested and cut into chaff, all things would eat it, and thrive on it exceedingly. There seems little risk of a plant, as no insect will touch it. When the crop is finished in November, and you plough it up, the roots are excellent for hogs, boiled like potatoes. Thus all is valuable. I believe, although we may never produce sugar from the full-grown stems, we may make an excellent white wine, or vinegar, and even molasses. At all events such things have been made from it in this North of France, where I am this 19th day of May sitting by a good fire, and feeling glad I have it. Whatever they do here, I am sure we can do; but until we know that it will ripen sufficiently perfectly to produce the required quantity of saccharine matter for these purposes, it would be useless to fill your paper with an account of the different processes. Suffice it to say, they are so simple that they come within the means and powers of the smallest farmer; indeed, here it is considered as great a boon to the little as to the large cultivator. During this summer I shall most likely see much more of the management and uses of this plant, and shall most certainly forward to you any further information I may obtain, and think of interest to my brother-farmers.

AN ENGLISH FARMER IN FRANCE.

Lille, May 19th, 1858.

THE PROGRESS OF AGRICULTURE IN AMERICA.

If there is one country more than another, to which the agriculturists of the United Kingdom have looked with some feeling of apprehension, it is to the United States of America. Indeed a *primâ facie* view of the subject might seem to justify their fears. When we look at the vast amount of fresh land of the most fertile quality continually brought under cultivation, coupled with the increased facilities for bringing the produce of those lands to market in Europe, there appears good ground for supposing that increased quantities of cereal food will annually be exported from thence to Europe, to the injury of European agriculture; subject as the latter is to heavy expenses from which the American farmer is exempt.

A nearer view, however, of the system pursued in the cultivation of the virgin soils of the United States, and of the acknowledged consequences of that system, will show that such apprehensions are groundless; and that although fresh land, to a large extent, and of great fertility, is continually being brought under tillage, the aggregate produce of cereal food, adapted to the European market, does not more than keep pace with the requirements of the growing populations.

We have now before us a work on the agriculture of the eastern part of the United States;* and although we are bound to admit that great efforts are put forth to induce the American farmers to adopt the European system of agriculture, the quantity of land cultivated in an efficient manner is infinitesimally small, compared with that which is farmed upon the old and normal plan adopted by the first settlers. We would give the Boards of Agriculture of the United States every credit for the efficiency with which they perform *their* part in laying down the true principles on which the land *ought* to be cultivated; but, with all deference to their local knowledge and experience, we are convinced that as long as fresh land is cheap and accessible, so long will the scourging system of cultivation be pursued by an overwhelming majority of the farmers, by which so much of the land in the old States has been reduced to sterility, and the aggregate acreage produce so much lessened.

It has been said that a sterile soil is usually better cultivated than a fertile one; and that the principal reason why England exhibits features in farming almost equal to gardening, is that the soil, generally speaking, is so inferior that it awakens all the energy of the cultivator to raise a remunerating produce. This rule, however, does not hold good in New England or Massachusetts. There the soil is certainly inferior in quality to most of the States; notwithstanding which, the scourging system has been at work there to such a degree as to extort the following statement from a speaker at the Massachusetts Agricultural Society's meeting: "One thing is certain, that under the influence of *practical farming*, as it is called, the land of New England has notoriously deteriorated to such an extent, that it is estimated that at least a thousand millions of dollars (£200,000,000 sterling) would be required to repair the effects of a wasteful and exhausting system of cultivation."

Again, in the report of the committee on farms of the Essex (N. E.) Agricultural Society, it is stated that notwithstanding premiums are offered of fifty dollars for the best-managed farms, only two competitors presented themselves, and one of these afterwards withdrew. Similar admissions are made by the committees for other societies. But a more striking proof of the hostility of the farmers generally to improvements, is the fact, that when a comparatively small sum was required to conduct a farm for experimental objects by the State, it was refused by the House of Representatives, although the tax individually would have been of the most homœopathic amount.

Now, when we consider that New England is the foremost State of the Union, in the encouragement of agriculture by the authorities; and that notwithstanding this, the produce of wheat has decreased in forty years 50 per cent. per acre, oats 40 per cent., Indian corn 70 per cent., sheep 70 per cent., &c., &c.; we may conclude that in the other States the same process of deterioration is going on; and that the accession of new land to the cultivation of cereal crops does not more than compensate for the falling off of production on the old land, and the increased consumption consequent on the increase of the population. We know from universal admission that in the State of Virginia, the drastic character of the tobacco cultivation, as conducted there, has reduced that fertile soil to such hopeless sterility, that a large portion of it is no longer cultivated, and the State itself is now what is called "a breeding State"—that is, chiefly devoted to raising negro slaves for the Southern market; the most degrading and ignoble purpose that can be conceived. It is also admitted that not only in all the old States, but even in those new ones that have been cultivated the past twenty years, the same process has produced the same effect, and after a few years the yield of corn, wheat, oats, &c., falls off; no manure, generally speaking, being applied to make good the waste of materials.

When therefore we hear of prodigious crops in the United States, ready to swamp all the European markets, we may conclude that it is nothing more than that boasting for which our transatlantic relatives are so much noted. We have heard much of this gasconade the last few years, but have felt little of its force. Since last harvest, for instance, which was to have been productive of great results, there has been less wheat and flour shipped from the States than for three years past. This may have been partly owing to the panic, which certainly prevented exportation *before* the frost set in. Still that ought to have caused a larger export trade this spring; and yet we hear that we are not to expect any considerable shipments of flour during the summer. The fact is, our prices are either too low, or the flour is wanted at home, the latter being the most probable solution of the question—or the want of money would compel the shipment, now that the panic has subsided, at whatever price, were it not that a safer market (and a better) is found at home.

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* Fourth Annual Report of the Secretary of the Massachusetts Board of Agriculture, with the Reports of Committees, &c., with an Appendix, &c., &c. Boston, U. S.: William White, printer to the State. 1857.

There is one department of the exhibition at the Massachusetts *cattle shows* that has rather startled, as well as amused us. We give the account in Mr. Parkhurst's (secretary to the Plymouth A. S.) own words:

"The most attractive scene of the whole show was to take place at ten o'clock—the exhibition of *female equestrianism,* which did not take place till eleven o'clock. Twenty-six ladies entered their names for premiums: but thirteen appeared on the ground. The cavalcade left the village about eleven o'clock, and went around the track once, each lady accompanied by a gentleman, and presented themselves before the judges' stand. By order of the judges they performed a variety of evolutions, riding in pairs, in quartets, all together, and each lady alone, riding slow or fast, as best suited her taste or convenience. After performing an hour or more, they left the ground. These equestrians performed their parts—so far as we are capable of judging—well. Many of them laboured under disadvantages: their horses were not thoroughly trained to the saddle. There were a few good horses, but generally they were not fit for the occasion. The question comes up, whether this is the proper place for ladies to exhibit for premiums?—whether the fairest of Nature's workmanship should be shown for money, *in connection with the grossest animals and the products of the land?* I think not."

Is not the Secretary rather hard on his fair friends? At any rate here is another hint for us at home. We have long maintained the national advantage of giving premiums for well-bred horses, but it remained for our transatlantic friends to culminate the attractions of such an exhibition.

THE PRACTICAL VALUE AND APPLICATION OF TOWN SEWAGE.

There are certain questions, more or less directly affecting agriculture, with which the Legislature would appear to be very loath to deal. There is the law of landlord and tenant, for instance, in many ways susceptible of improvement and adjustment. And when we press for as much, our rulers calmly hear us out, and answer, "Had not you better settle this amongst yourselves, and make it all a matter of private agreement? We would really rather not interfere." Then, again, we wish for some uniform system of selling our produce. It is quite a puzzle now to know what we should reasonably ask and have. Here we are courteously met with the rejoinder "that unanimity must be the herald of uniformity. So long as you differ so much amongst yourselves, once more, we would really rather not interfere." And for a third point there is the sewage of towns, of such immense value to the farmer, if he can only be brought to think so. What will he give for it, or how shall we give it to him? The Government is still by no means over-anxious to interfere. Theirs is yet a Fabian policy. It may or may not be of value, and the farmer cares or does not care about it. The best way will be to appoint another Commission to inquire into the matter. And another Commission is appointed accordingly; and the Chancellor of the Exchequer goes back to his budget, and the Premier to his several little troubles at home and abroad; while we return to the argument of liberal covenants, sale by weight or measure, national settlement, repeal of the malt tax, and so on.

As regards this question of town sewage, it is pretty generally admitted that the festina lentè plan of approaching it is by far the most discreet. The last Commission, indeed, which has now been at work something over twelve months, is in anything but a hurry. The report it has just issued is in reality little more than "a feeler," offering or sanctioning suggestions as to how the sewage may be got rid of, and how occasionally employed. It is not our purpose here to follow, or to attempt to follow out a plan, itself by no means developed. The subject, however, has gradually become one of some interest to the agriculturist. He has, at any rate, heard so much about it. In fact, whenever it turns up in conversation he expects almost as a matter of course to be complimented by some worthy citizen on his indifference and stupidity. He will be told how after-ages will scarcely credit his suffering such valuable matter to be wasted. And when, perhaps, with his patience exhausted, he demands how he is to use it, or prevent its being wasted? the worthy citizen bates his breath, and but echoes the official answer, "Let us have another Commission."

It is only a few years since that the assumed value of sewage for agricultural purposes very nearly led us into mischief. The wild talk of a few amateurs, and the wonders of Tiptree hall, Myer mill, and Cumming park, were not without their effect. There were schemes, in short, as plentiful as blackberries, whereby the sewage of towns was to more than pay for its distribution. Its value to the farmer was infinite, until one day, in Hanover-square, Professor Way told him what it really was worth. And this once more put the cunctando drag on the amiable enthusiasts. We had another Commission, with such men as Professor Way and Mr. Lawes on it. It is their report which is now before us. Since their appointment they have visited officially LOCALITIES WHERE SEWAGE IS APPLIED TO LAND IN A LIQUID FORM:—Rugby, Watford, Edinburgh, Rusholme, Mansfield, and Milan—LOCALITIES WHERE WORKS FOR THE PURIFICATION OF SEWAGE ARE IN OPERATION:—Croydon, Leicester, Tottenham, and Cheltenham—And the FARMS of Lord Essex, at Cashiobury; of Mr. Mechi, at Tiptree; of Mr. Wheble, at Bulmersh Court; of Mr. Kennedy, at Myer Mill; of Mr. Telfer, at Cumming Park; of Lord Breadalbane, at Luing; and of Mr. Harvey, near Glasgow. The Commissioners very properly decline any close comparison between the application of the liquid manure of a farm and the general use of town sewage for the same purpose. They do not give any detail of the places they visited; but they find that sewage in its liquid state is profitably applied to *grass* land in the neighbourhood of Edinburgh, as well as of Milan. It is gradually going out of use for arable land; while the formation of a solid manure from it, at one time a very popular project, it is shown, "will not be remunerative." The commissioners thus cautiously sum up their experience. After enumerating various difficulties, drawbacks, and expenses, that we need not recapitulate here, they so declare themselves:—"The Commission, *however*, believe that *on the whole* there can be no doubt that the sewage of a town, in a liquid state, can be *more* profitably disposed of by direct application to land than by any other means, *provided* that, relatively to the population producing it, the area to which it is applied be *small*, that its use *be limited to grass*, that all *natural levels be taken advantage* of, and that the works be characterized by skill and a *judicious economy*." This reads careful and honest. With skill, economy, natural facilities, and good judgment, the sewage of towns *may* be of service. Of course the Commissioners found endless mistakes and extravagance in its application so far; and on many of the sites that had been spoken to as very models for our adoption. Had the agriculturists of this country been only half as ready to act on ill-considered advice as some people were to give it, we dare scarcely contemplate the serious loss that would have been the consequence.

And yet there are some of their friends, even now, that will tell them the same sort of thing. A week or two since, the Society of Arts had a special meeting to discuss this Report of the Royal Commissioners, and for any one who chose to say anything he liked on so attractive a subject. The Society has already made itself rather famous in this way. Neither Mr. Chadwick nor his opponents were, unfortunately, or fortunately, present; but an M.P.,—Mr. Lawrence Palk—was. The honourable gentleman came, too, armed with the usual kind of ammunition. He was from Devonshire, "where the system of irrigation was by no means new." He had been to Leicester, and "witnessed Mr. Wickstead's plan of deodorization"; and "he held in his hand a letter from Mr. Campbell, of Rugby." One knows but too well what this all means, and how the honourable gentleman must finish, as he did, in this wise—

"This was a question which was well worthy the attention not only of gentlemen connected with large towns, but also of those who, like himself, were connected with the agricultural interests of the country. If they looked to the increasing value of guano, and the difficulty there was in obtaining it pure, he thought it was important that science should be brought to bear, in order to retain for the use of the agricultural districts that which was the bane of large towns, but which was of such extreme value to the farmer."

Another substitute for guano—well worthy of the attention of the agricultural interest—and of such immense value to the farmer. Now, in plain sober English, what does this really come to? Just this: that under certain circumstances, and with very good management on his own part, the farmer may be able to employ the sewage of towns to some advantage. Why can we not be content with saying so much, instead of running away with superlative expletives, and crying up plans that have so far proved neither altogether profitable nor practical? Mr. Lawrence Palk represents an agricultural constituency, and if so he he expects his supporters to act up to what he says, the less he says about this matter the better. It is such wild work on the part of those who undertake to advocate the farmer that does so much mischief. One would suppose, with the case of Mr. Palk and his water-meadows before us, that we could not spend too much of our time and means in arriving at the grand consummation embodied in the use of town sewage.

The Royal Commission is luckily composed of stouter stuff. Few men understand the farmer and his wants better than Professor Way and Mr. Lawes. They unite in a report that treats the use of sewage for agricultural purposes as but a matter of secondary consideration. We have always been inclined so to regard it. Let the towns get rid of their refuse as best they can, and let the farmer use it when he can. With certain facilities at occasional sites it may answer its end; but let no plan go out of the way to assume that the use of sewage is to be attended with "extreme value" one way or the other.

TO DESTROY WIRE WORM.—Procure a sufficient quantity of nitrate of soda to allow 1½ cwt. per acre; have it well broken on a hard floor, and sifted through a fine sieve, in order that it may dissolve the quicker, spreading made equal to the plants. It is advisable to sow it when the ground is damp; but it often happens that at this season such is not the case, consequently it is advisable to use the hoe after sowing the nitrate to admit it to the root of the oats, and to sow in the afternoon, taking the chance of a heavy dew. I consider nitrate of soda the greatest fertiliser ever known, also the quickest in its operation. I have seen it, when the ground has been in a moist state, change the countenance of the oats in four days. In Cuthbert Johnson's "Encyclopædia of Agriculture, &c.," in the treatise on the wireworm he quotes a statement from a Mr. Tallant, who affirms that he has frequently freed fields infested with wireworm by sowing white mustard.—CHARLES NEWMAN, Court Farm, Reading.

CALENDAR OF AGRICULTURE.

Continue during the first part of June to prepare the land for turnips, which are sown as speedily as possible during the last half of the month. Use farm-yard dung in a warm or soapy condition, not wholly cooled, but in the latter fermentation. Open drills at 26 inches distance; spread the dung evenly along the furrows in a quantity that no bare ground is left; reverse the drills over the dung. Sow the turnip seeds on the fresh tilth, and in dry seasons roll the drills lightly to exclude drought and retain moisture. In sowing turnips with auxiliary manures, as bones, guano, ashes or rape-dust, use Hornsby's drop-drill, which sows two rows at regular intervals of nine inches, the manure and turnip seed mixed together, which affords a ready food to the young plant.

Plough pared and burned lands with a light furrow, and produce a fine tilth by ample harrowing, before sowing the seeds during the latter part of the month. If the land be clayey and stiff, sow on the furrow slice, well harrowed. On loamy soils reduce the land by workings, and drill it; well mix the soil and the ashes. Sow rape and cole seed for winter food. Plough lands from which winter tares have been consumed; harrow the surface into fineness, and sow the turnip seeds in rows by means of a machine with lengthened coulters to make ruts. Sow in broadcast the headlands of the turnip fields; and use short dung that is easily covered.

Horse and hand hoe beet-roots, carrots, and parsnips—allow not one single weed to be seen.

Potato drills, not rolled after being planted with sets, may now be harrowed; plough deeply the intervals of the drills with the miniature plough, which is the best implement yet devised for stiff-bottomed lands; keep the hand-hoes and scuffler constantly going, break all clods, and pulverize the soil very deeply and freely. Fine earths are essential to all root crops.

Continue the feeding, in the yards, of cows and horses, with clovers and vetches; feed amply, provide abundant littering, and convey the superfluous liquid to the tank; but it is best when absorbed by straws and culms.

Cut all tall weeds from among the grain crops; allow not any weeds to perfect the seeds on pastures, in fences, or on road sides. Many seeds are winged, and carried by the wind to a distance, and propagate very rapidly.

Finish the shearing of sheep this month: examine the animals closely, as they pass through hands at this time, in the mouth, the shape, the quality of the wool, and in the general appearance. An inspection of the animals at this time, and the putting upon them distinctive marks, will very much assist the sorting of them for the tupping season in October.

Put mares to the stallion every fortnight. Wean lambs by placing them at once beyond hearing the bleat of the ewes, and give them the best grass on the farm.

Hay cutting will commence this month. Ted the grass quickly behind the mowers; put into cocks, spread them out and cock it again, and carry to the rick. Employ plenty of hands, at least six to each mower. Turn clovers in the swathe without tedding, as much shaking loses the leaves, which are the best part of the plant. Put the grass into large cocks, which may stand in the field for a time. When hay gets damaged by rains, the quality is somewhat recovered by mixing salt in the ricks 30 lbs. to a load.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MAY.

Although the weather has been by no means warm for the time of year, arising from the numerous changes in it, vegetation has made considerable progress; and in most parts of the country it may be considered seasonably forward. In our large grain districts, the young wheats have continued to wear a healthy appearance; and very few of our farmers appear disposed to doubt the return of an average crop. Of course, as yet, it would be premature to offer any decided opinion on this important matter; but certainly present appearances are very favourable. As regards the spring crops, which for the most part are growing rapidly, our advices are satisfactory. Very few reploughings have been found necessary; and the loss of plant has been smaller than for some years past.

A highly interesting report on the subject of the progress of agriculture in the United States, under the fostering influence of Congress, has just come to hand. A bill has been lately introduced, with every prospect of success, for granting to the several states 6,340,000 acres of land, for the purpose of promoting and encouraging agricultural colleges, and schools for the mechanical arts. There is to be apportioned to each state a quantity equal to 20,000 acres for each senator and representative in Congress, to which the states are now respectively entitled. This is undoubtedly a wise measure on the part of Congress; and it is to be regretted that a similar scheme could not be carried out in the United Kingdom. Amongst other matters referred to in the report in question, we are informed that over 400,000,000 acres had been granted to fifteen states, for the establishment of universities, prior to 1854. This may appear a most startling announcement; but we are informed by the Secretary of the Interior that the United States still possess *one thousand million of acres yet undisposed of!* When we consider this enormous quantity of uncultivated land, and the energy of the people of America, we can scarcely anticipate anything short of a rapid increase in the soil's productions. A few years of scientific research, aided by the discoveries of modern science, will, in our opinion, double the produce of the American soil.

Although steady importations of foreign wheat and flour have taken place, there has been rather more firmness in the demand for wheat; and in some instances fine qualities have produced a trifle more money. Apparently, however, present quotations are not safe, because the inland navigation in the United States is re-opened, and heavy shipments of wheat have been commenced from the Lower Baltic ports. Everywhere, great abundance exists. In this country there is, we believe, more wheat on hand than has been almost ever known at any corresponding period of the year; and in America the supply is, according to all accounts, enormous. No doubt the surplus supply of the world will be forwarded to us; and no doubt the quantity will be in excess of our wants. Under these circumstances, speculation is out of the question; and we are somewhat apprehensive that the shipping-houses on the continent, most of whom have continued to force sales ex ship for many months past, will determine to sell on arrival, to the prejudice of the English farmer. The present returns upon the entire crop of last year, however, are more satisfactory than might appear at first sight. We must not forget that the yield has turned out very large; that the condition of the wheats is first-rate; and that a large portion of the arrivals from the North of Europe is inferior in quality; hence, a wide difference exists in prices, and that difference is certainly in favour of English qualities; still prices are low—lower indeed than could be desired; but, at the same time, the total return in money to the home growers, taking into account the comparatively high value of barley and other spring corn, is somewhat in excess of former periods of great depression in the trade, the result of overwhelming importations from abroad.

For barley, oats, beans, and peas there has been a steady, though not to say active, demand, at fair average quotations. Throughout the continent extensive supplies remain on hand; and we have every reason to anticipate unusually large importations during the remainder of the season.

Good and sound potatoes have now become exceedingly scarce; prices have consequently advanced. Inferior parcels have sold heavily, at drooping currencies. The importations from the continent have nearly ceased.

The wool trade has been in a most inactive state throughout the month; and at the colonial sales prices have given way 1d. to 2d. per lb. English wool, however, has become rather firmer in price than it was at the commencement of the month. The total importations of foreign and colonial wool into England during the first four months of the year were 122,382 bales, against 139,070 bales in the corresponding period last year. This deficiency has since been more than made good by the arrival of 40,000 bales in the month just concluded.

In Ireland and Scotland agriculture has made satisfactory progress; and the fluctuations in the value of grain have been trifling. Fat stock has, for the most part, realized fair quotations; and the supplies forwarded to England have been quite equal to many former seasons.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that the supplies of live stock on offer in the Metropolitan Market have been only moderate for the time of year, little or no improvement has taken place in the general demand, compared with the previous month. However, prices generally have ruled steady. As regards the condition of the beasts and sheep brought forward, we may observe that it has been fully equal to most corresponding periods of the year. The dead weights have, too, fairly come up to previous estimates. These are important matters in connexion with the production of live stock. In the first place they prove that grazing has continued to hold its high position; and, in the second, that the supply of meat is increasing. There may be a great difference of opinion on this latter point; but no one who has narrowly watched the progress of agriculture, and who has carefully observed the various changes which have presented themselves during the last ten years, will deny that our enormous consumption of animal food is now easily met by the home producers. The depressed state of the trade and commerce of the country has, no doubt, caused less activity in the cattle trade; but we believe that there is now what may be fairly termed an abundance of fat stock in nearly every district in England. High prices during the past year, and the absence of disease amongst the cattle, have produced a result both important and gratifying. In many former years, owing to the scarcity of food about this period, large numbers of beasts and sheep have been forced for sale in little less than a half-fat state. Such, however, is not the case at present, owing to an abundance of hay on most farms, and to the rapid extension of the root-crop system. But with all these favourable features, it must be admitted that grazing has become rather an unprofitable business, arising from the unusually high prices paid for store animals during nearly the whole of 1857. The present moderate rates at which fat stock is selling may, however, serve as a wholesome check to what may be termed high speculative prices for store stock, even of a first-class character. If we trace the course of the cattle trade through a series of years, we shall find that high prices almost invariably lead to a decline in the consumption; indeed, place the actual necessaries of life beyond the reach of the great consuming classes, this result is in no way surprising: hence, we argue that moderately high prices are the safest basis upon which to conduct both the live and dead trade.

We have again to notice very moderate importations of foreign stock, notwithstanding that the value of meat in France has had a drooping tendency, and that the drain upon the resources of Holland for French consumption has become less excessive. We may remark likewise that the general condition of the beasts and sheep imported has fallen off, compared with many previous months. The future arrivals of stock from Holland are not likely to increase, for the all-important reason that the supply in the country has fallen off, and that our prices show no margin of profit on imports.

The following supplies have arrived in the metropolis during the month:—

Beasts	1,118	head.
Sheep	3,931	„
Lambs	185	„
Calves	1,461	„
Pigs	13	„
Total	6,708	„
Same time in 1857	7,243	„
„ 1856	3,556	„
„ 1855	7,103	„
„ 1854	4,708	„
„ 1853	13,007	„
„ 1852	8,506	„
„ 1851	9,214	„

The total supplies of home and foreign stock exhibited in the Great Metropolitan Market have been as under :—

Beasts	18,741	head.
Cows	480	„
Sheep and lambs	115,886	„
Calves	1,671	„
Pigs	2,760	„

COMPARISON OF SUPPLIES.

May.	Beasts.	Cows.	Sheep and Lambs.	Calves.	Pigs.
1857....	18,722	450	104,990	1,415	2,530
1856....	18,995	495	119,640	1,260	2,545
1855....	19,847	410	113,600	2,470	2,590
1854....	20,831	576	124,824	2,146	2,435

Last month 12,850 Scots and shorthorns came to hand from Norfolk, Suffolk, Essex, and Cambridgeshire ; 2,500 of various breeds from other parts of England ; 497 Scots from Scotland ; and 208 oxen, &c., from Ireland, *via* Liverpool.

Beef has sold at from 3s. to 4s. 6d. ; mutton, out of the wool, 3s. 2d. to 4s. 6d. ; lamb, 5s. 8d. to 7s. ; veal, 4s. to 5s. 4d. ; and pork, 3s. 2d. to 4s. 4d. per 8 lbs. to sink the offal.

COMPARISON OF PRICES.

	May, 1855.	May, 1856.	May, 1857.
	s. d. s. d.	s. d. s. d.	s. d. s. d.
Beef, from	3 0 to 4 8 ..	3 0 to 4 10 ..	3 0 to 5 0
Mutton ..	3 2 — 5 0 ..	3 6 — 5 4 ..	3 4 — 5 4
Lamb....	5 2 — 6 10 ..	5 4 — 6 6 ..	5 6 — 7 0
Veal	4 0 — 5 4 ..	3 10 — 5 6 ..	3 8 — 6 0
Pork	3 0 — 4 4 ..	3 4 — 4 8 ..	3 8 — 5 0

Newgate and Leadenhall have been seasonably well supplied with both town and country-killed meat. From Scotland the arrivals have been on a very liberal scale. A steady business has been transacted and prices have ruled as follows :—Beef, from 3s. to 4s. ; mutton, 3s. 2d. to 4s. 4d. ; lamb, 5s. 4d. to 6s. 6d. ; veal, 3s. 8d. to 4s. 6d. ; pork, 3s. to 4s. 4d. per 8lbs., by the carcase.

HERTFORDSHIRE (SOUTH.)

We cannot call to mind a season when the country has looked more beautiful, and the various crops more promising for a plant than they do this spring. Wheat is particularly well spoken of, good fields being the rule, and indifferent fields the exception. The tillage for spring corn has been completed under most favourable circumstances, the turnip sheep having "poached" the land less during the past winter than for many previous years ; consequently barley and oats, which love a fine seed-bed, have come up strong and healthy, and generally a full plant. A few complaints of wire-worm have been prevalent in the past week. We suggest to our friends that they should *poison* these pests, as the best means of checking them. We do not mean by this that farmers should purchase any of the thousand-and-one nostrums they are solicited to buy by "agents" of every denomination ; but we mean that a considerable portion of the crop of swedes or other turnips should be eaten where it is grown, that the sheep should have a little corn or linseed-cake with clover-chaff in addition, and by this means check the progress of the wire-worm under the ground, and force the corn rapidly out of the ground. Winter beans have borne the easterly winds well, and on clean land promise for a good crop. Spring beans have set well; but in many places are growing on foul land, which can never pay. It always gives us pleasure to find a farmer forward with the hoeing of his beans, and many fields are now being hoed for the second time. We regret to add that other fields are yet strangers to the hoe, and probably will receive little attention until the cleaning of the mangold crop, preparation for turnip-sowing, and other pressing matters, puzzle the farmer; who, in despair, turns some tegs into his bean-field to pick out the rank weeds—a practice we cannot admire or recommend. Mangolds have been extensively planted, and in various ways; some preferring the ridge-cultivation, others the flat (after deep-ploughing, or subsoiling). On strong soils, complaints are general that the land works unkindly for mangold-sowing, and our own clod-crusher is out on a mission to reduce a neighbour's stubble-soil. We do not care to advise our friend, who is somewhat hasty in temper if not in business, and might take it amiss; but we seriously think that if he thoroughly cleaned and ridged the land in the autumn, intended for mangold, and simply had to fork out odd roots of twitch, &c., cart on his manure, and split his ridges in the spring, he would not so often require our crusher. The store of mangold is large and very good: indeed we have never known a better season for winter-food in this part of England, and we were no little astonished, when on a visit in the north of Lincolnshire, in March last, to find a few acres of swedes had been sold by auction, at £14 per acre, at that time—a ha'penny each for the turnips, as my informant assured me. Breeding and store cattle are now being turned out to grass, the sharp frosts having kept stock in the yards for the night a little later than usual. Store sheep maintain their price, in spite of the fall in wool and mutton ; and at Hemel Hempstead fair, on Thursday last, sellers preferred taking their sheep home again to submitting to lower prices. Our stall-fed beef is pretty well cleared out, and when the demand for lamb abates, we shall not be surprised at a rise in mutton. Some fine rains during the last twenty-four hours have been highly beneficial to corn and grass. Succeeded by warm nights, we may reasonably anticipate good crops of mowing-grass, the meadow-lands having been well dressed with dung, and eaten down close during the past winter. Wheat continues a wretched trade, with no prospect of amendment. Other descriptions of corn realize a fair price. The splendid weather for farming-operations with which we have been favoured for the last twenty months must be a source of thankfulness to the English farmer, and we do not envy the disposition of him who complains, but think he had better take the first outward-bound ship, and compare his native clime with far-away lands, rich in gold and discomfort.—May 15.

DERBYSHIRE.

We have now come to a most delightful period of the year. The aspect of the county pleases the eye, even to the mountain-top, with its verdant hue. We have plenty of grass ; and stock is generally laid on to graze. Potato-planting is now the chief employment, and a considerable breadth is being put in. There is plenty of seed found, and the value of such has receded. That mysterious thing called potato-disease, because we suppose there is nothing else to designate it by, seems to lose its virulence as the winter leaves us, and now we hear little of it, and see less. We have had a splendid seed-time, and all kinds of spring cereal crops have a good appearance. The wheat-plant is as fine as we can desire, and the quantity of yellow blades, generally termed by the practical man *Maying*, is much less than we expected to have seen ; and as that appearance or non-appearance is considered to augur well or ill for the future, we hope that future is fraught with abundance. Farm work is very forward ; and turnip-drilling has in some districts already commenced. The demand for what is generally termed artificial manures continues unabated : in some instances they realise more money, while most other things in connection with farming are of less value. We imagine as a farming community we are going to the extreme in this respect ; we first exhaust the soil by taking our culmiferous crops, and then as a consequence are obliged to purchase those nitrogenous—dearest of manures, at too much haphazard. Would it not be wiser to curtail our cropping, and reduce our need of such extraneous aid? For instance, instead of two white crops between what is termed the fallow, would it not be better to seed down with rape after turnips? thus having three years for pasture on a five-course system, one corn-crop, and one turnip-crop. We leave this hint with our readers; but we put it in practice, and keep up the stamina of the soil. Our spring markets and fairs for stock have been depressed, and everything has given way in value. Our corn markets have for depression kept pace with the metropolitan report, and we have of wheat now a good home-supply on hand. Many farmers refused to sell, last autumn, because they considered prices were not remunerative. The comparatively high value of grain for several years past had unfitted them as a body for so sudden a reduction ; and the majority held on and on, until now their case becomes almost hopeless, and a good quantity of their corn, wheat especially, has yet to be brought to market; hence the prospect of coming prices. The labour market is easier, and good skilled hands are more readily met with: wages for adult labourers from 12s. to 15s. per week. We trust, with a better supply of men, agricultural improvements will still further advance, for if the principle be sound of buying in the cheapest and selling in the dearest market, then he must be the wisest man who employs the most men when they are obtainable at the least rate.—May 12.

ISLE OF ELY.

If we remember correctly, when our last report left us the weather was severely cold, with sharp frosty nights; but we believe, ere it appeared in print, the weather had suddenly changed, and we had some very fine warm days, and were willing to hope spring had really come. But we were sadly disappointed; for May opened upon us with cold nipping winds blowing chiefly from the north and north-east, and the days were nearly all followed by frosty nights. We also had some cold rains at the beginning of the month, and it was not until the last few days that milder weather set in. The wind then veered to the S.S.W., and has since been blowing softly, and vegetation is rapidly progressing. We have also had some very fruitful showers, with thunder and gleaming sunshine. We cannot speak so favourably of the appearance of the growing wheat as we did a month ago. The cold rains which fell early in May have made some of the cold tenacious clay soils present a yellow and sickly hue, which is always a bad omen at this season of the year, and bespeaks a small ear and a lighter yield. On the black fen soils the weather has produced an opposite effect, having made the wheats grow *soft* and *flaggy*; and we see many fields where a good deal is *laid* already, and looks yellow and weak in the stem. Many of our Fen farmers are sending men with hooks and scythes to cut off some of the heavy flag, thereby enabling the plant to rise again. At present these soils look much more like yielding a heavy crop of straw than a large produce of grain. But it is always difficult to predict in May what will be the state of the crop in August, as the changes in a crop of wheat whilst growing are frequently so sudden and so great that we never know the result until it is actually attained. The cold rains and frosty nights have seriously injured the oat crop, and in the Fens generally it is now looking badly. The wireworm has committed fearful ravages in some instances, and several fields either have been or must be *resown*. On the high lands the prospect is better. Beans generally are strong and look well. Mangel sowing is nearly completed. The rains and warmer winds of the last few days are highly favourable. Grass keeping is improving. Our pastures are now good, but we hear of complaints in some counties of grass being very scarce. Store cattle are lower and slow to sell, we conceive in consequence of the shortness of keeping in other localities. Beef is slightly better to sell. Store sheep are dearer; mutton maintains its value. Pork is still a heavy trade, and store pigs a little dearer. The wheat trade fluctuates slightly, most weeks either a shilling up or down. Supplies are not heavy, and the weather and appearance of the growing crops will now exert considerable influence upon prices.—May 18.

SUFFOLK.

Within the past few days we have had a change of wind from N. and N.E. to S. and S.W., and the consequent increased temperature combined with refreshing showers of rain have greatly improved the appearance of vegetation generally in the county. The wheats for the most part look promising, and it is the opinion of many that the crop never presented a better appearance; but we observe in some cases a too perpendicular ascent of the stem, and a want of tillering. The coldness of the weather, and especially the frosts each night, have naturally retarded the growth of the barley, and on the stiff clay soils the influence has been particularly remarked; but since the late refreshing showers a burst of luxuriancy has been the result, and the strength of the stem and the curliness of the blade give indication of an abundant yield. Owing to the winter's frost so well pulverising the land prepared for beans, the plants are strong and luxuriant. The peas look equally well. The mangold wurtzel seed has been put in very satisfactorily, and the plant is generally up, with a dark-green thrifty appearance. The cultivation of swedes has greatly diminished, owing to the superiority of the mangold crop. Some are already sown and up, whilst others are daily being drilled. Stock farmers have been much pressed for food, and the chief reliance has been the mangold wurtzel crop, which yearly increases its reputation: even many flocks have lived mainly on this root; and where a bite of green food has been given in addition, the ewes and lambs have thriven well. Beasts have been put on a shorter allowance of food, or they are sent early to market, but so unsatisfactory have been the returns, that the graziers' losses are considerable, and men reluctantly submit to such heavy sacrifices.—May 18.

CUMBERLAND.

The weather during the spring months has been as favourable for cleaning and preparing the land for the reception of the seed as could well have been desired. It was sufficiently dry for the operation of pulverizing and cleaning the land, and yet was supplied with sufficient moisture by the showers of rain that occasionally fell to prevent it from baking with drought or stunting vegetation by want of moisture. On the afternoon of Friday, the 14th inst., the east of Cumberland was visited by a good deal of thunder, heavy showers of rain falling here and there—in some places mixed with a considerable quantity of hailstones. This was followed, on the evening and night of Saturday, with a considerable fall of rain, which has continued at intervals up to the present time; and to-day and yesterday it has been blowing—and continues to blow—something like a hurricane. A rather large breadth of potatoes has again been planted under favourable circumstances, so far as the weather and state of the land are concerned, but the result will depend upon the after-part of the season being wet or dry. Mangel wurzel has been extensively sown this year. The importance of this valuable root is rapidly becoming better understood and appreciated. The sowing of swede turnips has been retarded these last few days, in consequence of the land being too wet from the recent rains to allow of its being properly finished up; the consequence is that much fewer turnips have been got in than might otherwise have been the case. Wheat, as it has done all the winter, is looking very well—perhaps, too gross and thick upon the ground, with a too-luxuriant blade, which, should it turn out a damp summer, may be very prejudicial to the crop. Oats were got in favourably and are going on well, with little harm from their old enemy the grub. Barley, too, was got in well, and is so far promising. Grass lands received a considerable check from the severe weather in the early part of March, with some cold east winds in April; but the fields rapidly recovered their green hue, and have lately been full of grass. Should the present wet weather continue some time longer, it will give a chance of a good crop of hay, as, according to the old adage,

> "A wet May
> Gives plenty of hay."

The grain market, especially wheat, continues much depressed, without any prospect of much improvement. Oats and barley, though selling at a comparatively better price than wheat, have been lower during the last two or three weeks. Beef and mutton are both lower than some time ago. Penrith fair, held on the 23rd April for sheep and the 24th for cattle, being the first important fair in the district, is a criterion to judge by of the value of cattle. At this fair cattle and sheep for grazing sold lower than expected, consequently the dealers, at least many of them, would realise a loss instead of a profit, having picked them up in the country at a price beyond what the market would afford. Although prices are considerably lower than last year, they are still high when compared with some former years. As regards sheep, the decreased price of wool has assisted materially to reduce their value, and yet wool has often been known to be sold at a less price than it is likely to be this year. There is no reason for farmers to despond: the price of agricultural produce is going through one of those periodical times of depression which have regularly occurred in the course of from eight to ten years. If any have reason to fear, it will be those who have lately taken their farms at an increased rent in proportion to the late high price of agricultural produce, under an impression that these prices would be permanent.—May 19.

EDINBURGHSHIRE.

Seldom have we to announce such favourable weather for field operations during the all-important months of spring. At short intervals we experienced intense frosts, the thermometer ranging occasionally from 10 to 15 degrees below the freezing point. Less damage has been done to the young wheat and seedling grasses than we have seen at a higher temperature. This is no doubt attributable to the extensive drainage which has been carried on for many years past, coupled with the extreme dryness of the soil during winter and spring. As a fact, only 5.50 inches of rain has fallen, at a water-gauge kept in the highest district of the county. Wheat appears of average breadth, and the fields everywhere look vigorous and well planted. Barley and oats, along the sea-board and in the finer districts, look healthy in the extreme; while in the middle and alpine districts, they have of late assumed a rather sickly appearance, evidently suffering for want of rain. Beans appear more extensively sown than formerly, and undergoing the process of cleaning by horse and manual labour. In the lower districts potato planting was commenced before the sowing of spring corn, which is now under horse and hand cultivation. High as the price of seed has ranged, and the heavy loss sustained last year, a full average extent of ground appears planted. The cultivation of this invaluable root has become somewhat resembling a "lottery," some obtaining a handsome prize, while the majority have to put up with a small show, and many blanks entirely. A few samples are still pitched in our weekly market, and prices receding. Sowing of Swedish turnips has been prosecuted vigorously during the month of May, and doubts are entertained that the nipping frosts may have injured those brairded as likely to run to seed, ice being of considerable thickness in the standing pools in May. The wind has now veered to the south-west, with frequent showers, which will have the beneficial effect of pushing forward a rapid vegetation, affording a full and sweet bite for all kinds of bestial. The extent of land under turnips is annually increasing, and from the quantity manured in autumn abridges greatly the labour when portable manure is only necessary in spring. Cattle markets are unusually large for the season, 1,206 being exhibited on the Edin stance on the 12th instant; finest quality was reduced in price, while secondary and inferior could scarcely be turned into money: 256 grazing cattle appeared, and found ready buyers at high rates: milk cows numbered 139, many of excellent quality and in good demand: of sheep 4,997 were penned, being 900 more than last week; a considerable number were hoggs for grass; for both sorts a good demand was experienced at extreme rates—blackfaced mutton (in the wool) from 8d. to 8½d., whitefaced 6½d. to 8d. per lb.: pigs numbered 398—young ones from 7s. to 10s. a head; grunters from three to four months old cheap, and difficult to dispose of. Grain markets are large for the season of the year; wheat meets a sluggish sale at reduced rates, barley in limited supply and meets a dull sale, oats brought freely to market (1,464 qrs.) with a good demand and former rates fully supported. Wool growers have had the best of it for years past, prices being unusually high. Since the crisis in November last a decline of fully 6d. per lb. has been experienced. Seedling grasses seem well planted; the breadth appears less than in bygone years; the open winter and spring made speculations in hay anything but remunerative, and the prevalence of depasturing young grass with sheep greatly abridges the hay crop. English portable thrashing machines have been busily employed in cleaning out the barnyards, being found admirably adapted for leaving the straw in a fitting state for thatch. This has been long felt as a great desideratum in our Scotch machines, calling loud for some improvement in this respect. Wheat-growing farmers have suffered severely from the unfavourable state of the weather during the last harvest, and large quantities are unfit for baking, and have to be disposed of for distilling and feeding purposes. The mania for farms still continues, and when advertised the puzzle is not to get a tenant, but how to select one. The farmer class are frequently "outbid" by individuals who have saved money in other occupations, their professed object being country air and residence. Money still appears to be their object, and after feeling a few years' disappointment, frequently leave in disgust. Draining operations are somewhat abridged; and no wonder, seeing to what extent it has been carried on for years. Still we have no redundant population, and willing hands find ready employment at fair wages. While writing, the protracted drought has at length been changed into a drenching rain. The streams are much increased. The change will be gladly appreciated by all—the agriculturist in fostering vegetation, which has been lingering; the manufacturer in adding to his water power; the compensation ponds throughout the county being lower than they have been for a number of years; draw wells have been dried up, and recourse is had to the "pitcher" and "can" for supply at the nearest stream.—May 20.

WEALD OF KENT.

Since our last report we have experienced some very sudden changes in the temperature of the atmosphere, with piercing easterly winds, which have tended to slacken the growth of the wheat plant to a certain extent. On stiff clay soils slackness of plant is complained of; but on good land this is not the case, and it only needs warm weather to succeed the showers which we have lately been favoured with: we might then calculate upon a luxuriant appearance. The pastures are very bare, which cannot be wondered at, with such cold weather. Beans and peas that were sown early are looking well for the most part. Barley and oats not so well as we could wish, still, with milder weather, we shall not have much room for complaint. The price of Lent corn has not varied much since our last, with the exception of oats, which are very scarce in this neighbourhood, and are selling at high prices compared with other grain. The hop plantation is now receiving considerable attention; tying has commenced; the bine does not look healthy, and is much infested with flea; a full crop this year would prove very injurious, looking at the immense quantity in the hands of growers, speculators, and factors. Great credit is due to the members for East Sussex, who have by their assiduous exertions obtained from the Chancellor of the Exchequer the postponement of the duty, which is a very great relief to a large body of the planters; had the full payment been insisted on, immense sacrifice must have been made to enable them to have met the demands.—May 19th.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BOGBAIN MARKET.—A good show of cattle of every description. There were no fat sheep, but plenty hoggs and shot lambs. The sheep were not in great demand, especially the blackfaced. Prices, however, were in advance of those of last market. Cattle were fully 5 per cent. up. Highland queys, two-year-olds, were sold at £4 15s. A Highland bull, a two-year-old, fetched £10. The market was very brisk.

BUNGAY FAIR was the largest as to attendance of company and the show of stock, especially neat stock, which has been held for many years. Business was dull, owing to the shortness of feed; but as the time approached for driving off the unsold, the demand became much brisker, and a fair amount of trade was done in fat stock at from 6s. 6d. to 7s. per stone. Fresh stock also was in demand, and sold freely at a slight reduction upon the London quotations. Several good horses were exhibited.

CASTLETON FAIR.—The quantity of stock offered was small, and the trade very slack. Beef, about 11s. per score; heifers and calves, from £10 10s. to £13 10s. each; yearlings, £5 each; two-year-olds, £6 10s. to £7 10s. each. A few sheep offered; but few sales, if any, were made. The best store pigs at from 25s. to 35s. each; small, from 4s. 6d. to 8s. 6d. each; sows, with their young pigs, £4 to £4 5s. each.

DUNSE HOGG TRYST.—The supply was fully an average one. The demand was good, and a great many sales were made. The following were the current prices: Cheviots from 16s. to 22s.; cross-bred from 26s. to 34s.; a lot of half-bred sold at 40s. There were a number of stirks in the market, which were selling at from £6 to £10 each.

DUNSMUIR TRYST.—There was a large attendance of farmers, dealers, and others, and there was a considerable quantity of stock on the ground, which found ready purchasers on good terms. Prices of prime fat were 9s., down to 8s., according to quality. A very excellent lot of queys, considered the best in the market, were sold by Mr. Webster, Witston, to Mr. Welsh, Tillytoghills, at £16 16s., which was considered about 9s. per stone; and several other lots were sold at the same price. There was a fair supply of grazing cattle, which were for the most part disposed of fully above that figure. The other descriptions of cattle met a ready sale at reasonable prices; and, on the whole, the market was good.

EXETER FAIR.—The attendance of agriculturists was good; and the number of beasts driven in was rather above the average. The trade, however, was not brisk, and a great deal remained unsold. Best beef fetched from 9s. to 10s. per score. Barreners, best quality, 6s. 6d. to 8s. per score; cows and calves, £10 to £16. There was a good supply of store sheep, and prices ranged from 30s. to 38s. each.

GLOUCESTER MONTHLY CATTLE MARKET.—An abundance of beef, mutton, and lamb, and purchasers were well supplied with every description of stock. Beef ruled from 6d. to 6½d.; mutton, 6d. to 6½d.; lamb, 8d. to 8½d. per lb.

HAY FAIR was a full one of stock. Young steers and fresh barrens were in good demand, but owing to the want of grass in the midland counties the dealers were not willing to speculate for fresh bullocks. Good cart horses were readily sold at very remunerative prices; there were but few good hacks, and for them prices were lower.

HALTWHISTLE FAIR.—Shorthorn cows, milking or in-calf, made from £15 to £19; stirks, £7 10s. to £9. Galloway cows, in milk or about dropping a calf, from £12 to £15—some prime ones a few pounds over the last figure; heifers, calved or in calf, from £11 to £13; stirks, £5 to £6 10s.; two-year-old bullocks or heifers, from £7 10s. to £8 10s. Irish heifers, £5 to £7. Galloway cows, not in milk, ready for the grazier, £9 10s. to £11 10s. There was only a small show of sheep. Blackfaced hoggs ranged from 16s. to 19s.; Leicester hoggs, from 23s. to 27s.; Cheviot ewes, with lambs at their feet, from 35s. to 38s. a couple. The Leicester hogs were also good in quality. There were 23 cartloads of pigs, of average quality, which sold well. Pigs six or seven weeks old, from 11s. to 15s.; seven to nine weeks, 15s. to 19s. and 20s.

HEREFORD FAIR.—Fat cows sold readily at 7d. per lb. for all on offer; fresh barrens and young grazing stock also commanded a ready sale, but lean steers and cows with calves, of which there were a large number in the market, hung on hand rather heavily, owing to the lateness of the season and the high price of keep in some districts. There was a large supply of sheep in and out of the wool. Fat wethers, and all ovine stock fit for the knife, readily realised 7s. per stone in the wool, with a proportionate reduction in others for the absence of the fleeces. Ewes with lambs ruled about 46s. to 48s. per couple; a few very prime ones fetched over 50s. Lambs sold singly to the butchers from £1 to £1 8s., according to age and fatness. Store pigs were numerous, and changed hands with celerity, at prices fully equal to those which have lately been obtained. There was a large horse fair; but besides a limited number of useful hacks, which met a ready demand, the majority of horses on offer were for heavy draught purposes; these also sold extremely well, according to age, condition, and quality.

HOLBEACH FAIR.—A large show of horses; many of them very middling and inferior, but for anything good (and there was a fair supply of these), there was a brisk demand, and rather better prices were obtained than have prevailed of late, the attendance of buyers being very great.

IPSWICH FAIR.—The show of cattle and sheep was larger than seen for years. Owing to the recent flatness in the Metropolitan Market, trade opened dull and continued heavy throughout the day. Fat beasts fetched from 6s. 6d. to 7s. per stone—store beasts from 3s. to 3s. 6d. per stone what they will weigh when fat. Hoggets from 32s. to 48s.; fat lambs, 25s.; stores, 13s. to 22s.; couple from £2 2s. to £3; stock lambs from 14s. to 24s. Of cart horses and colts, there was about an average supply.

KIDDERMINSTER FAIR.—An average supply of cows and sheep, for which there was but a moderate demand. Only the best stock fetched previous prices, they generally being at lower rates; mutton scarcely realizing 6½d., and beef 6d. per lb. A good show of pigs, which sold at rather less than of late.

KNIGHTON FAIR was very numerously supplied. Prices were obtained much superior to those of any neighbouring fairs. Mutton brought 6½d. to 7d.; beef, 5½d. to 6d. Store animals sold well. Wool fetched 1s. to 1s. 8d. per lb.

LEDBURY FAIR.—A goodly number of excellent fat cattle, including some fine oxen. The supply of sheep was also tolerably good, more especially stores, which did not sell quite so well as at former fairs. Of store cattle also the supply was larger than the demand, and upon all kinds of stock a slight reduction in price had to be made before sales could be effected. The fair was also tolerably well supplied with store pigs. The fat stock was nearly all disposed of. Fat cows, 6d. to 6¾d. per lb.; ditto sheep, 6d. to 6½d., and a few choice ones a shade dearer; store sheep 26s. to 38s. each; ditto pigs, 20s. to 40s. each.

LINCOLN SHEEP MARKET.—A fair, though by no means a large show of sheep, and prices were fully 1s. to 2s. per head lower than the high rates realized this day fortnight.

MUIR OF ORD MARKET.—The show of cattle was above the average of May; there was also an extensive show of hoggs. The prices of sheep, that is hoggs and lambs, were slightly above those of last market, and a good many sales took place, buyers and sellers seeming equally eager to do business. In cattle there was an advance from the price of last market, varying from 5 to 10 per cent.; or, as it was loosely said on the market, of £1 10s. on the average stock. The prices were therefore not very much below those of May, 1857—very different from what all but the most sanguine calculators had looked forward to. The heavy rains which have lately fallen all over the north have given farmers assurance of a fair grass crop, and increased the upward tendency in prices commenced at the April market on the Muir. There were a good many south-country dealers present. The market was very brisk. There was not much done in the horse market.

NEWARK FAIR. — A large show of beasts and sheep. The former sold readily at advanced prices. The best stores for summer grazing made from £12 to £14 each. Milkers also realized good figures. Sheep were disposed of at liberal prices, but did not sell quite so well as at the previous market. Hogs 42s. to 45s. each. The horse fair was large, but it contained many animals of an inferior order. The better sort of horses, of which there was a tolerable sprinkling, were very soon disposed of.

NEWTON STEWART MONTHLY CATTLE MARKET.—Sales were very brisk, and the cattle of each class (stirks and two-year-olds) brought good prices. Whether from the prospect of a plentiful supply of grass, or other causes, the prices obtained were fully beyond what had been anticipated, and if this one be taken as an earnest of our future markets during the season, our farmers and graziers will certainly be well remunerated.

STRATFORD-ON-AVON FAIR. — The number of fat cattle was small; the supply of stores was good; stirks, &c., making from £4 to £10 each; cows with their calves were plentiful, and met with a ready sale from £14 to £22 together; barrens brought from £10 to £18; calves, weaners, from 30s. to 50s.; sucklers, from 25s. to 35s. each. There was a brisk demand for sheep, of which there were penned about 3,000, besides lambs of first-rate quality, and there were several fine lots of sheep shown in the wool. They brought high prices. Beef, 5d. to 6d. per lb.; mutton, 5½d. to 7½d.; veal, 6½d. to 7½d.; lamb, 7½d. to 8½d.; pork, 6½d.; fat bacon pigs, 8s. 6d.

to 9s. per score. There were very few horses shown, though much inquired after. Decent animals brought high prices.

STURMINSTER FAIR.—A good supply of the various descriptions of stock, heifers and calves meeting with a brisk and ready sale, but the prices for fat stock were on the decline, and business in this way moved very slowly. The trade in barreners was very dull.

TEWKESBURY FAIR was but thinly attended, and there was a short supply of stock. The sale of beef was flat, at from 5d. to 6d.; mutton met with a better sale at from 5½d. to 7d. per lb.

TOLLER DOWN FAIR.—The attendance was not so large as usual, in consequence of the rough weather. The supply of sheep also was not very extensive, but there was a good demand, and they sold well. Very high prices were asked for horned ewes, and horned lambs fetched from 22s. to 26s. per head. A large show of cow stock, but of a rather inferior description. Among the horses were some very promising animals, both cart and hack.

WELLS FAIR was well attended by dealers and buyers. The show of cattle was not very large, and consisted chiefly of heifer stock. There was a good number of sheep penned, many of them shorn. Of pigs, also, there was a good show. Trade was pretty brisk.

WISBECH FAIR.—A large supply of horses and good animals, not a few of which realised good prices. A great many bullocks were also brought to town, and for which large sums were given. The sheep were about the average price.

WOODBRIDGE FAIR.—A very large attendance, and a good supply of stock. Good heifers and calves were in demand, and those offered sold readily at high prices. Barreners were also inquired after, and met a ready market.

WOOLER FAIR.—Bred hoggs brought from 36s. to 43s., half-breds from 27s. to 36s., and Cheviots from 22s. to 26s. Ewes, of which there were a good many small lots, were bringing readily, for ewes with single lambs, 50s., and with double lambs 60s., some few of the latter as high as 67s. There was a small show of grazing cattle, but what there was brought good prices, considerably higher than they have been at the sales in the neighbourhood. Good two-year-olds were bringing from £10 to £13. The number of cows was larger than usual, but being principally old cows, there was a dull sale amongst them, except for two and three-year-old queys, calved and to calve, which were quickly bought up at from £10 to £14.

IRISH FAIRS.—Multifarnham.—Prime beef was scarce, and the best was quoted from 56s. to 58s. per cwt. Store cattle were plentiful, and numbers were in first-rate condition, but purchasers seemed particularly cautious in buying, so that sellers were obliged to submit to a reduction in prices. Three-year-old heifers brought from £10 to £13 10s. each; two-year-olds, £8 to £10 10s., and yearlings from £2 15s. to £4 10s. Good dairy cows were in active demand at full prices. Pigs were also brisk, and good Bacon sorts brought from 40s. to 44s. per cwt. Stores in good demand, at fair prices. Ballibay was abundantly supplied with cattle of all kinds, except fat cattle; buying was exceedingly brisk, and prices, except for young stock, which were rather dearer than usual, were equal to those obtained this month at neighbouring fairs. The demand for pigs was dull, both bacon and pork being sensibly lower.—Cavan: A great many cattle were left unsold, and prices were on the decline. For sheep the demand was very brisk, and all sold. Pork was cheaper than at late markets.—Bailieborough: All descriptions of cattle were plentiful, except beef. Few, if any animals, remained unsold, and everything maintained current prices.—Hillsborough was pretty well supplied with stock, excepting that beef was rather scarce. Strippers plentiful, and prices looking down. Springers in good demand at 10*l.* to 18*l.* each. The prices of store cattle were tending downwards. Two-year-old heifers sold at prices ranging from 7*l.* to 10*l.* 10s.; yearlings from 3*l.* to 7*l.* 10s. Pigs were very plentiful, and prices somewhat higher than during the past month. The supply of horses was smaller than usual at this fair; good animals were in demand at from 20*l.* to 40*l.* each.

CARMARTHEN BUTTER MARKET, (Saturday last.)—A better supply of good fresh grass Butter brought to our market this day, and our farmers freely obtained 98s. per cwt. for fair average quality. This drop in the market will give rise to an active demand, and we doubt any further marked reduction in value for the present.

CHIPPENHAM.—Good cheese had a ready sale. Old broad doubles, 58s. to 63s.; new, 56s. to 59s.; prime Cheddar, 60s. to 68s.; thin, 38s. to 50s.; skim, 18s. to 28s. per cwt.

GLASGOW.—There were seven carts shown in the bazaar, and 13 tons passed through the weigh-house scales. Sales were slow, and lower prices taken. Prime early-made, 48s. to 52s.; late-made and inferior, 42s. to 45s.; new skim, 23s. to 24s. per cwt.

GLOUCESTER.—The quantity of cheese pitched was small, and the quality generally inferior. The prices obtained were: Skims 25s. to 28s., second 40s. to 46s. No best quality on offer.

YEOVIL.—Best cheese 56s. to 70s., household 20s. to 38s. per cwt. A good business was done.

ENGLISH BUTTER MARKET.

LONDON, Monday, May 24.—Since our last report we have had a considerable fall in the price of all sorts of Butter, which now leaves the market pretty steady

Dorset, fine	102s. to 104s. per cwt.
Ditto, middling	90s. to 96s. „
Fresh..............	9s. to 13s. per dozen.

PRICES OF BUTTER, CHEESE, HAMS, &c.

BUTTER, per cwt.:	s.	s.	CHEESE, per cwt.:	s.	s.
Friesland..................	96to	100	Cheshire..................	64	80
Kiel..................	102	106	Cheddar..................	72	76
Dorset	100	104	Double Gloucester........	56	72
Carlow..................	—	—	HAMS:		
Waterford..................	—	—	York..................	78	84
Cork, ...	92	98	Westmoreland	78	84
Limerick	—	—	Irish	76	86
Sligo..................	—	—	BACON: Wiltshire, dried	70	72
FRESH, per dozen..10s. 0d. to 12s. 0d.			Irish, green	64	66

POTATO MARKETS.

SOUTHWARK, WATERSIDE, Monday, May 24.—Since our last report our supplies from foreign ports have been light, but coastwise rather more liberal. There is a considerable advance to note in prices of some descriptions, as the trade has been more active, at the following quotations:

Yorkshire Regents............	140s. to 190s. per ton.
Lincolnshire do...............	140s. to 160s. „
Dunbar reds	80s. to 90s. „
Perth, Fife, and Forfar Regents	120s. to 140s. „
Ditto ditto reds	80s. to 90s. „
French whites	40s. to 110s. „
Belgian do..................	40s. to 70s. „
Ditto reds	80s. to 120s „

BOROUGH AND SPITALFIELDS.

LONDON, Monday, May 24.—The arrivals of home-grown potatoes continue on a full average scale for the time of year. Since Monday last the imports have been confined to 150 tons from Dunkirk and 150 sacks from Antwerp. Good and fine qualities—the show of which is limited—are in fair request at full prices, but other kinds are very dull at barely late rates.

York Regents	140s. to 180s. per ton.
Kent and Essex do.	80s. to 160s. „
Scotch	120s. to 160s. „
Do. Cups	70s. to 90s. „
Middlings	50s. to 90s. „
Lincolns	120s. to 140s. „
Foreign	50s. to 90s. „

COUNTRY POTATO MARKETS.—York, May 15.—Potatoes sell at 1s. per peck, and 3s. 9d. to 4s. per bushel. Leeds, May 18.—A short supply of potatoes, which sold at 15d. to 16d. per 21 lbs. wholesale, and 16d. to 17d. retail. Malton, May 15.—Potatoes, 1s. per peck. Thirsk, May 17.—Potatoes, 6d. to 12d. per stone. Richmond, May 15.—Potatoes, 4s. 8d. per bushel. Sheffield, May 18.—Potatoes sell at 10s. to 18s. per load of 18 stones Manchester, May 20.—Potatoes, 11s. to 19s. 6d.

PERTH POTATO TRADE.—The export of potatoes to the southern markets has been going on to a small extent, but prices still remain the same as last week. Best sorts average from 22s. to 23s. per boll, and inferior from 15s. to 16s. per ditto.

REVIEW OF THE CORN TRADE

DURING THE PAST MONTH.

The first half of the past month was cold and ungenial, vegetation being kept in check, and a yellow hue was spread over much of the young wheat and barley; but warm showers and fresh breezes from the west, with a good deal of sun, have materially changed the face of things for the better, the only fear now entertained arising from the too luxuriant appearance of the forward wheat on highly cultivated land. An abundance of straw and grass is now pretty certain; but without dry, sunny weather, an equal yield of wheat with last year cannot be expected. Durham and Northumberland appear exceptions to the generally strong appearance of the wheat plant, from the long prevalence of drought and cold. As respects prices, the month has shown little change; the utmost fluctuations have not exceeded 1s. per qr., and the balance of the four weeks is a slight gain.

The state of the London and general averages shows a remarkable agreement, and the steadiness of prices throughout the entire country. To place the former on a par with the latter as respects time, they must be put one week back; and by so doing, we have this result: The general averages commence at 44s. 9d., and the London included therein were 47s. 8d.; the general close at 44s. 11d., and London at 47s. 11d.; making an advance of only 2d. per qr. in the general averages, and 3d. per qr. in the London—London commencing at 2s. 11d. over the general rate, and closing at 3s. over it. This small difference accounts for the slender supplies which have come to the London market, which is, however, well provided with foreign wheat and country flour. Future prices must greatly depend on the weather; but as the rates are much below the average of the last ten years, and the quality above it, we think farmers need not force off their stocks, as a good quantity of fine old wheat must be required for mixing, and foreign markets have lately been improving. The course of the deliveries for four weeks shows that less English wheat has lately been selling than during the same period last year. Last year's sales for a month were 439,893 qrs., this year they were only 402,861 qrs.—deficiency this season 37,032 qrs. Now as the importations, including flour, this year, for four months, have greatly exceeded the first four months last year —viz., to the extent of 607,818 qrs., or about 35,700 weekly—and yet stocks of foreign in all shipping ports are small, it follows that the low prices, with an increased population, have produced a consumption not calculated on; and this is likely to continue.

The prospects of a good crop abroad are not so promising as recently. Algeria has improved by a timely fall of rain, but last year's abundance is not looked for. Spain, in some places, has been suffering from drought; and in Asia Minor this has been excessive, and quite endangered the crops. Piedmont, on the contrary, has had too much wet; and in other parts of Italy it has not been genial. France still looks well, and in the South the wheat is coming into ear. In Northern Europe there are fair appearances, and American reports are generally favourable. The continental markets have been firm, or slightly dearer. France is decidedly so, the Paris flour market having recently advanced about 2s. per sack English, from the low stocks in millers' hands; and wheat has risen 1s. 6d. per qr. The best flour was worth 31s. 9d. per sack, and wheat 42s. 6d. per qr. At Bordeaux, the price was 41s. 9d. In Belgium the range was from 43s. 9d. to 45s. 9d. for top quality. At Amsterdam, prices were 40s. 6d. to 52s. 6d. At Rotterdam fine heavy red was worth 44s. At Hambro', quotations were 40s. 6d. to 42s. 9d.; Stettin, 43s. 9d; Danzic, where large sales have been making, 41s. to 48s. for high mixed; Berlin, 42s. 3d. per qr. Navigation being resumed at Petersburg, prices for soft wheat have opened at about 40s. 6d. per qr. At Odessa, the new supplies are dropping in plentifully; the quality is well spoken of, but rates have been firm, in consequence of the clearance of previous stocks. Polish wheat was held at about 33s. 3d., Ghirka 39s. 3d. per qr. The trade at Galatz is beginning with moderate quotations, 28s. only being demanded. Sales from Varna have been made at 32s. Prices at Trieste, which had received Spanish orders, were 43s. 2d. Genoa had risen 2s. per qr., and literally nothing has resulted from the Neapolitan permission to export at a high duty. The different markets in Spain, from north to south, are firm, though lately all were expecting lower rates. At Alicante, Taganrog wheat was worth 53s. 4d.; at Seville, 55s. per qr. With the canals open, New York is getting supplies, and flour has somewhat yielded; so that a moderate export has ensued. The wheat market looked heavy, but no quantity yet pressed on holders; the last quotations were about 48s. per qr. for the best Southern, and 42s. 6d. for Kentucky white. There is doubtless a good store in the lake ports, and the weather will influence holders there in their shipments; but with a return to monetary ease, and continuance of low rates, there seems no probability that exports will be very free.

The first Monday's wheat market in London commenced on the back of moderate supplies, both English and foreign. Kent and Essex, in the course of the morning, sent up quite an average show of samples. Factors commenced by asking higher terms, and in some instances 1s. per qr. improvement was realized, but eventually sales were made at former prices. The good attendance from the country was disappointing, holders of foreign not being able to sell at an advance, and only a small quantity was sold. The country markets throughout the week scarcely made any change in the quotations. Liverpool, on Tuesday, was unaltered, and Friday's rates there were hardly equal to the previous day.

The second Monday had better supplies, especially of foreign, a good deal of wheat being imported by millers direct. This circumstance was unfavourable to prices, notwithstanding a very small supply during the morning from Essex, and only a moderate one from Kent. For some time factors endeavoured to obtain the previous rates; but as the day wore, it was found necessary to concede fully 1s. per qr. generally; and there were offers at the Kentish stands at 1s. to 2s. per qr. less money, without an entire clearance. The business in foreign was very limited, at unaltered rates. Manchester, Hull, Boston, and Bristol markets were all rather against sellers, Newark, Spalding, Louth, and Gloucester, and several other places reporting 1s. per qr. decline; but Birmingham, being scantily supplied, was in favour of sellers, and several of the Saturday's markets were 1s. per qr. up. Liverpool, on Tuesday, was without change; but Friday was decidedly easier, both for wheat and flour.

The third Monday was less liberally supplied, the foreign not reaching to 6,000 qrs. Kent and Essex also sent up but a scanty show of samples, and factors therefore required some advance in their offers; this, though generally reported, was realized in very few instances, and for picked samples alone, the general runs not being placed at anything over the terms of the previous week. Newcastle, Hull, and the early Yorkshire markets noted no change in prices, the tone being firm. Newark, Spalding, Lynn, and Market Rasen were 1s. higher. Birmingham, Gloucester, and Bristol did not raise quotations. Liverpool, on Tuesday, had a good attendance, a large reduction being thought probable, from the liberal foreign supplies; the only fall, however, was 1d. per 70lbs. for wheat, and 6d. per sack on flour. On Friday, prices there were scarcely so good.

The fourth Monday was moderately supplied, the arrivals from Kent and Essex being limited. Early in the morning, fine parcels went off at full prices, but in the market subsequently the former rates were difficult to obtain, offers of 1s. per qr. less being refused by factors. The foreign trade was slow and unaltered. London remained unaltered to the week's close; Liverpool and several country markets quoted rather lower rates, but generally there was little difference throughout the country.

The imports into London during the first four weeks were 20,154 qrs. English and 48,763 qrs. foreign, against 28,600 qrs. English and 20,067 qrs. foreign in May, 1857. The imports into the United Kingdom for April were 383,149 qrs. wheat and 364,769 cwt. flour, against 196,278 qrs. wheat and 189,172 cwt. flour during the same month last year.

Flour during the first four Mondays in May has scarcely changed, town-made top quality remaining at the price with which the month commenced, viz., 40s. per sack. Norfolks have varied at from 30s. to 31s. per sack. The comparatively high range of prices at new York has so limited importations thence, that really fine qualities of this description have become scarce, and for this reason have rather risen in value; but French samples have been sufficiently plentiful for the dull state of trade, and have mostly left a loss to the importers, good qualities having brought only 32s. to 33s. per sack. The imports during the four weeks have been—in country sorts 68,402 sacks, in American 3,553 brls., with 9,287 sacks foreign, principally from France, against 71,448 sacks English and 3,761 brls. 110 sacks foreign in the same period last year.

The barley trade during the month has little varied, prices of the best sorts having declined with the season for malting, with very little left over fit for this purpose, so that maltsters will be entirely dependent on the growing crop for future business. The large importations from the Mediterranean have kept these descriptions at rates much below oats, with which they have been freely mixed; and as the stocks of English seem nearly exhausted, a good demand must yet be experienced—equal, we think, to any imports. So, with the prospect of beginning quite bare of this grain, good malting sorts seem again likely to be high priced. The best foreign, fit for distillation, is now worth about 30s. per qr.; while there are parcels of light grinding, say 48lbs. per bush., to be had at 22s. The imports during the four weeks into London were 2,349 qrs. English, and 66,145 qrs. foreign, against 1,121 qrs. English, 51,415 qrs. foreign in May last year.

The only difference in malt during the four weeks has consisted in a reduction of 1s. to 2s. per qr. on secondary and inferior qualities, the best Ware still slowly selling at 69s.

Oats, notwithstanding their relative dearness and large foreign supplies, have given way but little in price, in consequence of short arrivals for five months previously; the granary stores produced by the gluts of last autumn and winter being very much reduced, and had they not fed the market, a very high range of prices must have been obtained, notwithstanding the low value of wheat. The first Monday, though only 19,465 qrs. foreign were up, was better supplied than since 7th Dec.; prices, therefore, though they had previously advanced, were fully maintained. The second Monday gave a total of about 61,000 qrs.; prices receded 6d. to 1s. per qr.; but dealers had so long been waiting to buy, that nearly the whole was cleared at this reduction, and the market has since been well furnished, the fourth market being rather against sellers; and at the week's end there was a further decline of 6d. per qr., in consequence of further large arrivals.

Ireland, in all parts of it, has been rapidly rising; and as we have frequently noted a less growth in that country, it seems improbable that this grain can be cheap this side of harvest, for the Russian supplies coming late will be an almost exclusive dependence. The imports into London during the four weeks have been 1,403 qrs. English, 3,380 qrs. Scotch, 16,435 qrs. Irish, and 139,623 qrs. from abroad, total 160,841 qrs., against 1,598 qrs. English, 761 qrs. Scotch, 9,740 qrs. Irish, 55,328 qrs. foreign in May last year.

Beans have been steady in value, a decline of 1s. on the first Monday being the only change that has occurred during the four weeks. Arrivals from Egypt have proved less than expected, and do not now threaten to be large. The imports have been in four weeks 1,963 qrs. English, 8,792 qrs. foreign, against 4,062 qrs. English, 936 qrs. foreign in the previous May.

With the exception of a liberal arrival of white peas from the Baltic on the second Monday, this pulse has become quite scarce, nearly the whole English growth appearing to be worked up; but the high rates that have been paying for duns and maples has caused a liberal use of cheaper substitutes, especially in low barley, so that their absence has been little felt. Boilers, too, being past their season, have not rallied in price, and the month in this respect has been without change. The imports of English into London were only 153 qrs., the foreign 3,575 qrs., against 407 qrs. English, 1,147 qrs. foreign in May, 1857.

In linseed there has again been a rise, to the extent of 5s. per qr. on the month's course, in consequence of the large export demand. This advance has contributed to increase the value of cake, which was previously declining in consequence of the rapid growth of the meadows and all vegetation.

The seed trade has been generally quiet, the low rates at which red cloverseed was forced off by factors and some holders having brought on a moderate speculation. American red has become worth 44s. to 45s. per cwt., and other kinds in proportion; white and trefoil have not attracted attention. Tares remaining scarce have sold in retail, at extravagant rates; and canary seed, from the same cause, has risen to five guineas per qr. Rapeseed, being badly spoken of abroad, has also risen; but it is thought the reports of injury have been exaggerated. White mustardseed remains dear, and brown quite neglected. Carraway, corianner, and hempseed much as last quoted, and only in retail demand.

CURRENCY PER IMPERIAL MEASURE.

				Shillings per	Quarter.
Wheat, new, Essex and Kent, white	42	to 51	red	40	to 46
Norfolk, Linc. and Yorks., red				39	45
Barley, malting	—	to —	Chevalier	—	—
Distilling	32	34	Grinding	24	26
Malt, Essex, Norfolk, and Suffolk	57	65	fine	67	69
Kingston, Ware, and town made	57	65	"	67	69
Brown	53	55		—	—
Rye	—	—		28	30
Oats, English, feed	21	26	Potato	27	31
Scotch, feed	22	26	Potato	26	31
Irish, feed, white	22	24	fine	25	27
Ditto, black	21	24	,,	—	25
Beans, Mazagan	33	36	Ticks	34	35
Harrow	34	37	Pigeon	38	43
Peas, white boilers	40	45	Maple .. 42 45 .. Grey	40	43
Flour, per sack of 280lbs., Town, Households..33s., fine				36	40
Country	30	32	Households	33	35
Norfolk and Suffolk, ex-ship				29	30

FOREIGN GRAIN.

						Shillings per	Quarter.
Wheat, Dantzic, mixed	46	—	high do.	—	— extra	—	52
Konigsberg	40	48	,,	—	—	—	—
Rostock	43	—	fine	48	—	—	—
American, white	42	50	red	40	47	—	—
Pomera., Meckbg., & Uckermrk, red				42	47	—	—
Silesian, red	40	45			white	41	46
Danish and Holstein						38	45
Russian, hard	40	44	.. French	40	45 white	44	47
St. Petersburg and Riga						38	44
Rhine and Belgium						—	46
Barley, grinding	23	27			Distilling	30	32
Oats, Dutch, brew, and Polands	22	27			Feed	21	23
Danish and Swedish, feed	22	25			Stralsund	23	26
Russian						21	23
Beans, Friesland and Holstein						34	36
Konigsberg	34	37			Egyptian	33	35
Peas, feeding	40	42			fine boilers	43	44
Indian Corn, white	34	35			yellow	34	35
Flour, per sack, French	32	36			Spanish	—	—
American, per barrel, sour	18	22			sweet	22	23

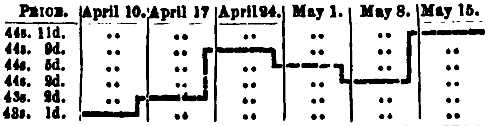
COMPARATIVE AVERAGES—1858-57.

From last Friday's *Gas.*		s.	d.	From *Gazette* of 1857.		s.	d.
Wheat	111,226 qrs.,	44	11	Wheat	116,811 qrs.,	57	5
Barley	10,899 ..	35	0	Barley	9,108 ..	43	6
Oats	9,362 ..	25	8	Oats	9,457 ..	24	9
Rye	21 ..	35	7	Rye	48 ..	41	6
Beans	4,618 ..	40	9	Beans	6,143 ..	42	6
Peas	447 ..	42	1	Peas	562 ..	40	10

IMPERIAL AVERAGES.

For the last Six Weeks:	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
April 10, 1858	43	1	36	8	24	1	30	9	38	6	41	1
April 17, 1858	43	2	36	7	24	7	30	4	38	10	41	5
April 24, 1858	44	9	36	5	24	9	33	3	39	9	41	6
May 1, 1858	44	5	36	1	25	4	28	1	40	8	42	4
May 8, 1858	44	2	35	5	25	7	30	10	40	9	42	2
May 15, 1858	44	11	35	0	25	8	35	7	40	9	42	1
Aggregate average	44	1	36	0	25	0	31	6	39	10	41	9
Sametime last year	54	7	44	0	23	7	38	0	40	7	39	6

FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT.



PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red —s. to —s., extra —s., white —s. to —s.
Trefoil .... —s. to —s.
Tares, Winter, new, per bushel ......6s. 0d. to 7s. 0d.
Mustardseed, per bush., new 17s. to 25s., brown 13s. to 15s.
Coriander, per cwt.................................. 20s. to 26s.
Canary, per qr. .... 86s. to 105s.
Linseed, per qr., sowing —s. to —s...crushing 67s. to 69s.
Linseed Cakes, per ton ....£9 9s. to £10 10s.
Rapeseed, per qr.................................. 70s. to 74s.
Rape Cake, per ton..........................£5 10s. to £6 0s.

FOREIGN SEEDS, &c.

Cloverseed, red 40s. to 46s., ... white 50s. to 60s.
Trefoil,.. 17s. to 18s.
Tares, Spring, per bushel .... 7s. 0d. to 8s. 0d.
Hempseed, small, per qr. .... Dutch 42s. to 47s.
Coriander, per cwt............................ 17s. to 26s.
Carraway ,, ... 44s. to 46s.
Linseed, per qr., Baltic 60s. to 65s.....Bombay 61s. to 65s.
Linseed Cake, per ton ....£9 10s. to £10 15s.
Rapeseed, Dutch .... 68s. to 74s.
Rape Cake, per ton ....£5 0s. to £5 10s.

HOP MARKET.

BOROUGH, Monday, May 24.—The trade during the past week has continued steady, and the market on the whole is very firm. Fine yearlings and good 1855's are in demand, and fully maintain previous rates. Our currency is as follows:—

Mid and East Kents....	70s. to 90s.,	choice 112s.
Weald of Kent........	54s. to 60s.,	" 66s.
Sussex	50s. to 54s.,	" 60s.
Yearlings, &c.	21s. to 35s.,	" 50s.

WORCESTER, (Saturday last.)—The reports of the growing crop are still unfavourable; the flea continues its ravages, and the nights are too cold for the bine to grow out of their reach. The planters hold back their samples for higher rates, which the merchants are unable to give, causing a very quiet market.

MAIDSTONE, May 20.—Very little improvement has taken place in our hop grounds, and the College ground, although highly cultivated, is very backward. We are, generally speaking, short of bine, and full of flea, close to the bottom of the plant.—*Sussex Express.*

CHICORY.

LONDON, Saturday, May 22.—Although the supplies of Chicory are by no means extensive, the demand for that article has fallen off, and prices are with difficulty supported.

ENGLISH, per ton	£ 0	0 to	£ 0	0	ANTWERP	£10	10 to	£11	0
HARLINGEN....	10	0	10	10	DACKUM	0	0	0	0
BRUGES	10	10	11	0	GUERNSEY	0	0	0	0
HAMBURG	0	0	0	0	BELGIUM........	0	0	0	0

HAY MARKETS.

Saturday, May 22.—SMITHFIELD.—A full average supply, and a sluggish trade.

CUMBERLAND.—Both hay and straw met a dull inquiry, at our quotations

WHITECHAPEL.—Supply good, and trade generally dull.

At per Load of 36 Trusses.

	Smithfield.	Cumberland.	Whitechapel
MEADOW HAY	50s. to 80s.	50s. to 80s.	50s. to 80s.
CLOVER DITTO	70s. 100s.	70s. 100s.	70s. 100s.
STRAW	24s. 28s.	25s. 28s.	24s. 28s.

COVENT GARDEN MARKET.

LONDON, Saturday, May 22.—Trade continues brisk, and the supply good. Some Cherries have been imported from France, but they are not very good. Strawberries are more abundant than they were last week. Some good Oranges have been imported from Barbary. Of Pears, Easter Beurré and Ne Plus Meuris may still be obtained. Barcelona Nuts fetch 20s. per bushel; new Brazils, 1s. 6d. do.; Spanish, 14s. do.; Almonds, 24s.; Walnuts, kilndried, 20s. do. Among Vegetables are Asparagus, Rhubarb, and Seakale. Winter Greens are plentiful. French salading is excellent; it still consists of Cabbage Lettuce, Barbe de Capucin, Batavian Endive, and Turnip Radishes. Cornish Broccoli realizes from 1d. to 3d. a head. French Beans are very plentiful. New Potatoes are largely supplied. Peas fetch 4s. per quart shelled; and green Artichokes from 4s. to 6s. per dozen. Cucumbers plentiful. Best samples of old Potatoes have advanced in price. Cut flowers chiefly consist of Orchids, Gardenias, Heliotropes, Poinsettia pulcherrima, Geraniums, Violets, Mignonette, Heaths, Primulas, Camellias, Cyclamens, Tulips, Hyacinths, and Roses.

FRUIT.

	s.	d.	s.	d.		s.	d.	s.	d.
Pineapples, per lb.	8	0 to	12	0	Pears, per doz.	6	0 to	10	0
Grapes, new, per lb.....	8	0	12	0	Apples, per half sieve..	3	0	6	0
Nectarines, per dozen ..	30	0	0	0	Oranges, per doz.	0	6	1	0
Lemons, per dozen	1	0	2	0	Melons	0	0	0	0
Peaches, per dozen	30	0	0	0	Filberts per 100lbs.	0	0	0	0
Strawberries, per oz. ..	0	9	1	6	Cobs, do................	35	0	40	0

VEGETABLES.

	s.	d.	s.	d.		s.	d.	s.	d.
Cauliflowers per doz	1	6 to	2	6	Tomatoes, per half-sieve	0	0 to	0	0
Broccoli, per bundle....	1	0	1	6	Leeks, per bunch	0	2	0	3
Greens, per doz. bunches	2	0	4	0	Celery, per bundle......	1	0	1	9
Seakale, per punnet	1	3	2	6	Shallots, per lb.	0	6	0	8
French Beans, per 100 ..	1	0	2	6	Garlic, per lb.	0	6	0	8
Asparagus, per bundle ..	3	0	6	0	Lettuce, cab., per dozen.	1	0	1	6
Rhubarb, per bundle....	0	4	0	6	Do., Cos, per score ...	1	0	1	6
Potatoes, per ton	60	0	109	0	Endive, per dozen	2	6	3	0
Do. per bush..........	2	0	2	9	Radishes, turnp, per doz.	0	0	0	0
Do. per cwt.	4	0	6	0	Horseradish, per bundle.	1	6	4	0
Do. New, per lb.......	0	6	2	0	Mushrooms, per pottle..	1	0	1	3
Carrots, new per bunch..	0	6	0	8	Parsley, per 12 bunches.	3	0	4	0
Turnips, per bunch	0	2	0	4	Basil, green, per bunch..	0	0	0	0
Spinach, per sieve	1	6	2	0	Marjoram, per bunch ...	0	0	0	0
Cucumbers, per dozen ..	10	0	15	0	Savory, per bunch	0	2	0	4
Beet, per dozen	1	0	2	0	Mint, green, per bunch..	0	2	0	4

TIMBER.

LONDON, Saturday, May 22.—The transactions in Timber have rather increased during the week. Prices generally rule about stationary.

Per load—	£	s.	£	s.		£	s.	£	s.
Quebec, red pine	3	5 to	4	10	Deals, Yel. Pine, per reduced C.:				
Yel. Pine	3	10	4	0	Canada, 1st quality.	15	0 to	16	0
Quebec Oak, White...	6	0	6	5	Do. 2nd do.	10	0	11	0
,, Birch.........	4	0	4	15	Archangel Yellow..	16	0	16	0
,, Elm..........	4	10	5	10	Memel	13	0	14	0
Dantzic Oak..........	4	0	6	0	Gothenburg Yellow.	13	0	14	0
Memel Fir............	3	10	4	5	Do. White........	11	0	12	0
Swedish..............	2	10	3	0	Gefle Yellow, 14 ft..	30	0	0	0
Masts, Qubc. Red Pine	6	0	6	10	Christiania, per C. 12 ft. by 3 by 9 in.:				
Do. Yellow Pine....	5	0	6	10	Yellow..............	24	0	28	0
Lathwood, Dantzic fm	8	0	9	10	White...............	19	0	24	0
Do. Memel	10	0	11	0	Deck Plank, Dantzic,				
Do. Quebec	5	0	5	5	per 40 ft. by 3 in....	1	0	1	10
Deals, per C. 12 ft. by 3 by 9 in.:					Staves, per Standard M.:				
Quebec Wh. Spruce.	9	0	11	5	Quebec Pipe.........	75	0	0	0
Do. Red Pine	11	10	17	5	Do. Puncheon....	20	0	23	0
St. John Wh. Spruce	11	11	15	0	Baltic Crown Pipe.	140	0	145	0

FLAX, HEMP, COIR, &c.

LONDON, Saturday, May 22.—The Flax market continues in a most inactive state, yet we have no change to notice in prices. There has been scarcely any inquiry for Hemp, and to force sales, lower rates must be submitted to. In Jute and Coir goods very little has been passing.

BARK, &c.

	£	s.	£	s.		£	s.	£	s.
English, per load of 45 cwt., del. in London	16	0 to	17	0	Cork Tree, Barbary ...	7	0	7	10
					Do. Leghorn	6	0	7	0
Coppice................	16	0	18	0	Valonia, Smyrna, p. ton	11	0	14	0
Dutch, per ton	5	0	5	5	Do. Camata........	13	0	14	0
Hambro'................	4	10	5	5	Do. Morea	9	0	11	0
Antwerp Tree	5	0	6	10	Terra Japonica } Gambier...	15	0	0	0
Do. Coppice	5	10	7	0	Terra Japonica } Cutch......	36	0	38	0
Mimosa, Chopped	7	10	8	5	Divi Divi...............	9	0	10	0
Do. Ground	8	0	10	0	Myrabolams	7	0	10	0
Do. Long	5	0	6	10	Sumach, Sicily, p. cwt.	0	13	0	15

HIDE AND SKIN MARKETS.

LONDON, Saturday, May 22.

	s.	d.	s.	d.		s.	d.	s.	d.
MARKET HIDES:					HORSE HIDES, each	8	0 to	0	0
56 to 64lbs......per lb.	0	3 to	0	3¼	CALF SKINS, light.	2	0	3	6
64 to 72lbs............	0	3¼	0	3½	Do. full	5	0	5	6
72 to 80lbs............	0	3½	0	3⅝	Shearling	0	11	0	0
80 to 88lbs............	0	3¾	0	4	Half-bred Sheep......	0	0	0	0
88 to 96lbs............	0	4	0	4¼	Downs	5	0	6	0
96 to 104lbs...........	0	4¼	0	4½	Polled Sheep	0	0	0	0
104 to 112lbs...........	0	0	0	0	Lambs.................	2	0	3	0

LEADENHALL LEATHER MARKET.

LONDON, SATURDAY, May 22.—We continue to be moderately supplied with almost all kinds of fresh goods, and the demand generally is active, at fully last week's quotations.

CROP HIDES.

ENGLISH

lbs.	lbs.	d.	d.
28 to	35	13 to	14
36	40	13	14½
40	45	13½	15
46	50	14½	16
50	55	15	17
55	60	16	18

B U T T S.

ENGLISH.

lbs.	lbs.	d.	d.
14	16	17	20
17	20	17	21
21	24	18	22
25	28	20	21
29	32	22	26
33	36	23	27

FOREIGN.

lbs.	lbs.	d.	d.
14	16	—	—
16	20	17	20
21	24	17	21
25	28	18	22
29	32	20	21
33	36	21	24
36	45	—	—
45	50	—	—

OFFAL.

	d.	d.
nglish Shoulders	13	17
Do. Cheeks and Faces	7	10
Do. Bellies	7	9½
Do. Middles	11	12
Foreign Shoulders	13	15
Do. Necks	10	12
Do. Bellies	7½	9½
Do. Middles do.	11	12
Dressing Hide Shoulders.	10	12
D. do. Bellies	7	8
Kip Shoulders	5	8
Do. Bellies	6	7

DRESSING HIDES.

	lbs.	lbs.	d.	d.
Common	20 to	24	12½ to	14
Do.	25	28	12½	14
Do.	30	34	12½	14
Do.	35	40	13	15
Saddlers	30	35	14	17
Do.	36	50	15	18
Balls			12	13
Shaved	14	16	16	17
Do.	17	19	15	17
Do.	20	23	14	16
Do.	24	28	14	16
Scotch do.	16	24	14	17
Coach, per Hide			25s. to	30s.

HORSE BUTTS. SHAVED.

	d.	d.	d.	d.
English	11 to	12	14 to	16
Spanish	10½	11	14	16

HORSE HIDES.

	lbs.	lbs.	d.	d.
English	13 to	18	11 to	14
Do. without butts	9	14	12	14
			s. d.	s. d
Spanish salted, without butts, per hide.	6	9	11 0	13 6
Do. do. do.	9	11	12 0	14 6
Do. do. do. inferior			6 0	8 0
Do. dry do.	6	8	8 0	10 6
Do. do. do.	9	11	10 0	12 6
Do. do. do. inferior			5 0	7 0

CALF SKINS.

Av. weight.		Unrounded.		Rounded.	
lbs.	lbs.	d.	d.	d.	d.
20 to	28	14 to	16	16 to	21
30	35	14	17	16	22
35	40	15	18	16	23
40	45	15	18	16	24
45	50	15	18	16	24
50	55	15	17	16	23
55	60	15	17	16	22
60	70	14	17	15	21
70	80	14	16	15	20
80	90	14	16	15	20
90	100	13	16	14	19
100	120	13	15	14	18

KIPS.

	lbs.	lbs.	d.	d.
Petersburgh	4 to	7	17 to	20
Do.	7	9	17	19
Do.	9	10	16	18
Do.	11	13	15	17
E.Ind.dry sltd.	5	7	18	22
Do. do.	7	9	16	19
Do. seconds			14	17
Do. thirds			12	14
Do. inferior			8	11

SUNDRIES.

	s.	s.
Hog Skins, best each	14 to	21
Do. seconds ,,	8	14
Seal Skins, split, per doz.	50	70
Do. for bindings ,,	36	70
Calf Skins, Sumach-tanned ,,	30	45
Do. white ,,	25	35
Horse Hides, white, each	8	13
Sheep Skins—	d.	d.
Basils, unstrained, per lb.	7	13½
Do. strained ,,	7	14
Do. facing, per doz.	5s.	16s.
Tan, Sheep, & Lambs ,,	10	16
White Sheep, per 120	50	90
Do. Lambs, ,,	40	80
Do. Sheep & Lambs, strained, per doz.	5	14
Sumach Roans, per doz.	16	30
Do. Skivers, ,,	5	12
Bark Skivers, ,,	7	12
Hide Splits, per lb.	9 to	11d.

WOOL MARKETS.

ENGLISH WOOL MARKET.

LONDON, May 24.—There is a slight improvement in the demand for fine English wools, at fully last week's quotations, although several parcels are announced for public sale in London after the close of the colonial series. In prices, no quotable change has taken place. Low qualities of wool are a dull inquiry; nevertheless, holders generally are firm, and prices are well supported.

Per pack of 240lbs.

Fleeces—Southdown Hogs	£13	0 to	£14	0
Do. Half-bred Hogs	12	10	12	0
Do. Kent	12	0	13	0
Do. Southdown Ewes and Wethers	11	0	12	0
Do. Leicester do.	13	0	13	10
Sorts—Clothing, picklock	15	0	16	0
Do. Prime and picklock	14	0	14	10
Do. Choice	13	10	14	0
Do. Super	12	0	13	0
Do. Combing—Wether matching	14	10	15	10
Do. Picklock	13	0	14	0
Do. Common	12	0	12	10
Do. Hog matching	16	0	16	10
Do. Picklock matching	14	0	15	0
Do. Super do.	12	0	12	10

LEEDS (ENGLISH AND FOREIGN) WOOL MARKTE, MAY 21.—A fair demand, to supply immediate wants, for most kinds of English and combing wools, and prices are firm at late quotations. For colonial clothing wool the demand is not brisk, and the manufacturers in the district generally complain of the dulness of trade.

YORK WOOL MARKET, MAY 20.—To-day, the second market for the new clip of this year (the late rainy weather being unpropitious for sheep-shearing) we had but a small supply of wool, say about 10 or 15 sheets of new clip, and the same of old, with about half-a-dozen buyers. Several lots remain unsold, and the prices of those sold may be fairly quoted at from 10d. to 11d., and 12d. per lb., as per quality. One lot, in splendid condition, realized a price over those quotations, but the exact figure was not stated.—*Yorkshire Gazette.*

LIVERPOOL WOOL MARKET, MAY 22.

SCOTCH.—There is scarcely an average demand for Laid Highland Wool yet, and prices are somewhat irregular. White Highland is only in limited demand. There has been little doing in either Cheviot or crossed this week.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs.	10	0 to	11	0
White Highland do	13	0	14	0
Laid Crossed do..unwashed	12	6	13	0
Do. do..washed	13	0	14	0
Laid Cheviot do..unwashed	14	6	16	0
Do. do..washed	17	6	18	6
White Cheviot do..washed	24	0	26	0

FOREIGN.—The improved feeling evinced in the daily progress of the public sales in London, imparts confidence in the trade generally, and we have more doing by private contract at steady prices.

BRESLAU, May 20.—Since our last report business has been still flatter, and prices pursuing their downward tendency. Yet neither a further decrease nor the near approach of the new clipping could attract a greater number of purchasers. Manufacturers were persisting in their reserve, and speculators directing their attention to fresh wools. Transactions did not surpass the amount of 2,500 cwts., consisting chiefly of Russian wools, ordinarily washed and scoured, as well as of fine Silesian one-shear, skins in bundles, and slipes. The following prices have been obtained:—For Russian wools, ordinarily washed, at from 52 to 62 thalers; ditto, scoured, 80 to 86 thalers; fine Silesian fleeces, 87 to 91 thalers; fine locks, 62 to 65 thalers; Silesian slipes, 58 to 65 thalers per cwt. The chief purchasers were the Zollverein combers and clothiers, as well as home commissioners, who were acting for French and English account. More vivacity has been exhibited in transactions on the sheep's backs, and more than 3,000 cwts. of all descriptions have been in this manner contracted, at a reduction of 10 to 15 per cent. compared with last year's June fair quotations.—GUNSBURG, Wool-broker.

MANURES.

PRICES CURRENT OF GUANO, &c.

	£	s.	d.	£	s.	d.
PERUVIAN GUANO, (per ton, for 30 tons) nominal	£13	5	0 to	£0	0	0
Do. Do. (under 30 tons)	14	0	0	0	0	0
BOLIVIAN GUANO none	0	0	0	0	0	0

ARTIFICIAL MANURES, &c.

	£	s.	d.	£	s.	d.
Nitrate Soda (per ton)	£18	0	0 to	£20	0	0
Nitrate Potash or Saltpetre	29	0	0	30	0	0
Sulpht. Ammonia	19	10	0	20	0	0
Muriate ditto	27	0	0	28	0	0
Superphospht. of Lime	5	10	0	6	0	0
Soda Ash, or Alkali	9	0	0	10	0	0
Gypsum	2	0	0	2	10	0
Coprolite	3	10	0	3	15	0

	£	s.	d.	£	s.	d.
Sulph. of Copper or Roman Vitriol, for Wheat steeping	45	0	0 to	47	0	0
Salt	1	0	0	1	15	0
Bones, Dust, per qr.	1	5	0	1	6	0
Do. ½-inch	1	4	0	1	5	0
Oil Vitriol, concentrated, per lb.	0	0	1	0	0	0
Do. Brown	0	0	0¾	0	0	0

OIL-CAKES.

	£	s.	d.	£	s.	d.
Linseed-cakes, per ton—						
Thin American, in brls. or bags	£9	15	0	£10	10	0
Thick do. round (none)				0	0	0

	£	s.	d.	£	s.	d.
Marseilles	£9	0	0 to	£9	10	0
English	10	0	0	0	0	0
Rape-cakes, per ton	5	10	0	6	10	0

END OF VOLUME XLVIII.

MJ

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